ETSI EN 300 328

TEST REPORT

For

Smart 300N Broadband Router

Model: BR485d

Brand : E-TOP

Issued for

E-Top Network Technology Inc.

No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	February 08, 2012	Initial Issue	ALL	Sunny Chang

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1. TEST REPORT CERTIFICATION

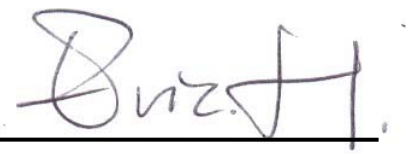
Applicant	**:**	E-Top Network Technology Inc.
Address	**:**	No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.
Manufacture	**:**	E-Top Network Technology Inc.
Address	**:**	No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.
Equipment Under Test	**:**	Smart 300N Broadband Router
Model Number	**:**	BR485d
Brand Name	**:**	E-TOP
Date of Test	**:**	December 15, 2011

APPLICABLE STANDARD	
STANDARD	**TEST RESULT**
ETSI EN 300 328 V1.7.1 (2006)	No non-compliance noted

Approved by:

Jeter Wu
Assistant Manager

Reviewed by:



Eric Huang
Assistant Section Engineer

2. EUT DESCRIPTION

Product Name	Smart 300N Broadband Router
Model Number	BR485d
Brand	E-TOP
Received Date	November 28, 2011
Frequency Range	IEEE 802.11b/g ,802.11n HT20:2412MHz ~ 2472MHz IEEE 802.11n HT40:2422MHz ~ 2462MHz
Transmit Power	IEEE 802.11b: 18.71 dBm IEEE 802.11g: 18.34 dBm IEEE 802.11n HT20: 18.23 dBm IEEE 802.11n HT40: 18.40 dBm
Channel Spacing	IEEE 802.11b/g, 802.11n HT20/HT40: 5MHz
Channel Number	IEEE 802.11b/g, 802.11n HT20:13 Channels IEEE 802.11n HT40 :9 Channels
Transmit Data Rate	IEEE 802.11b：11, 5.5, 2, 1 Mbps IEEE 802.11g：54, 48 ,36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20 : 130,117,104,78, 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mbps IEEE 802.11n HT40 : 300, 270,243, 216,162 ,135, 121.5, 108, 81, 54, 40.5, 27, 13.5 Mbps
Type of Modulation	IEEE 802.11b：DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g：OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40：OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	**Two antennas (2TX2RX)** Manufacture: YONG-SHUN TECH. CO., LTD. Type: Co-linear dipole structure Model: AN-152RRSU00 Gain: 3dBi for 2.4GHz, 4dBi for 5GHz Connector: Reverse SMA PLUG
Power Source	**Powered from adapter** Model: JKY36-SP1201000 Input: 100-240Vac, 50/60Hz, 0.5A Output: 12Vdc, 1000mA

NOTE:1. Client consigns one model sample to test (Model Number: **BR485d**).
Therefore, the testing Lab. just guarantees the unit, which has been tested.

2. For more details, please refer to the User's manual of the EUT.

3. To add a series model is for business necessary. The different of the each model is shown as bellows:

Multiple listing:

Company Name/Address	Brand name	Model	Product Name
E-Top Network Technology Inc. No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.	E-TOP	BR485d	Smart 300N Broadband Router
Sapido Technology Inc. No. 383., Sec. 2, Minsheng Rd., West Central District, Tainan 700, Taiwan, R.O.C.	SAPIDO	RB-1830	Smart 300Mbps Dualband Router - All Broadbands

3. DESCRIPTION OF TEST MODES

The EUT is a 11n router. It has two transmitter chains and two receiver chains (2x2 configurations). The 2x2 configuration is implemented with two outside chains (Chain 0 and Chain 1).

The RF chipset is manufactured by Realtek Semiconductor Corp.

The antenna peak gain 3dBi (highest gain) were chosen for full testing.

IEEE 802.11 b ,802.11g ,802.11n HT20 mode (DTS Band)

The EUT had been tested under operating condition.

There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2442
High	2472

IEEE 802.11b mode: 11Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11g mode: 6Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT20 mode: 13Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT40 mode (DTS Band)

The EUT had been tested under operating condition.

There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2422
Middle	2442
High	2462

IEEE 802.11n HT40 mode: 13.5Mbps data rate (worst case) were chosen for full testing.

The worst-case data rates are determined according to the description above, based on the investigations by measuring the PSD, peak power and average power across all the data rates, bandwidths, modulations and spatial stream modes.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ETSI EN 300 328 V1.7.1 : 2006 – Electromagnetic compatibility and Radio spectrum Matters (ERM) ; wideband transmission systems; data transmission equipment operating in the 2.4GHz ISM band and using spread spectrum modulation techniques: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW-1037).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Germany	TUV NORD
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

6. CALIBRATION AND UNCERTAINTY

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

6.2 MEASUREMENT UNCERTAINTY

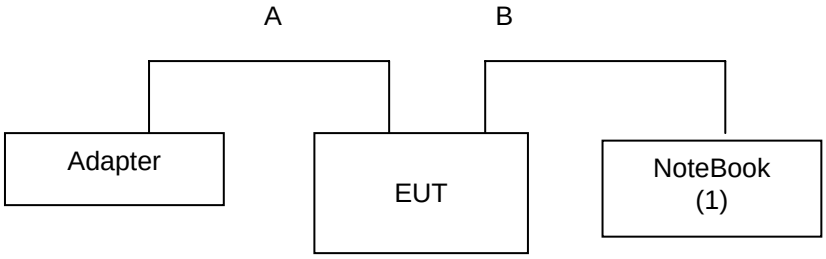
Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	±0.523 x 10-5
Total RF power, conducted	±1.3dB
RF power density, conducted	±2.5dB
Spurious emissions, conducted	±2.6dB
All emissions, radiated	±4dB
Temperature	±1℃
Humidity	±3.2%
DC and low frequency voltages	±1.8%

Uncertainty figures are valid to a confidence level of 95%, k=2

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT



7.2 SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	Note Book	IBM	T43	DoC	Power cable, unshd, 1.6m

No.	Signal cable description	
A	DC Power	Unshielded, 1.2m, 1pcs
B	LAN Cable	Unshielded, 1.0m, 1pcs

Remark:
1. All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

7.3 EUT OPERATING CONDITION

RF Setup

1. Set up all computers like the setup diagram.
2. Reset equipment and burn in the test program “MP_Test”.
3. The “Realtek Test Program for “RTL819x ” software was used for testing
   The EUT driver software installed in the host support equipment during testing was Realtek Test Program for RTL819x Drive

(1)TX Mode:

- ⇨ **IC Type: RTL_8192D**
- ⇨ **Mode:2.4G/SingleMac**
- ⇨ **Dev:WLAN0**
- ⇨ **Test Item :Continuous TX**
- ⇨ **Channel:1(2412MHz)、3(2422MHz)、7(2442MHz)、11(2462MHz)、13(2472MHz)**
- ⇨ **TX POWER: follow “Power Control”**
- ⇨ **Antenna: B、G Mode A, HT20、HT40 Mode AB**
- ⇨ **Tx Data : 1Mbps long** (IEEE 802.11b mode , TX)
  6Mbps (IEEE 802.11g mode , TX)
  13Mbps (IEEE 802.11n HT20 mode ,chain 0, chain 1 TX)
  27Mbps (IEEE 802.11n HT40 mode, chain 0, chain 1 TX)
- ⇨ **Bandwith: B、G、HT20 20MHz, HT40 40MHz**
- ⇨ **Start**

Power control

Target Power: IEEE 802.11b Channel Low (2412MHz) = 40
IEEE 802.11b Channel Middle (2442MHz) =38
IEEE 802.11b Channel High (2472MHz) = 36

Target Power: IEEE 802.11g Channel Low (2412MHz) = 49
IEEE 802.11g Channel Middle (2442MHz) = 47
IEEE 802.11g Channel High (2472MHz) = 46

Target Power: IEEE 802.11n HT20 Channel Low (2412MHz) = 43 **(Chain 0)**
IEEE 802.11 n HT20 Channel Middle (2442MHz) = 42 **(Chain 0)**
IEEE 802.11 n HT20 Channel High (2472MHz) = 41 **(Chain 0)**
IEEE 802.11n HT20 Channel Low (2412MHz) = 44 **(Chain 1)**
IEEE 802.11 n HT20 Channel Middle (2442MHz) = 43 **(Chain 1)**
IEEE 802.11 n HT20 Channel High (2472MHz) = 42 **(Chain 1)**

Target Power: IEEE 802.11n HT40 Channel Low (2422MHz) = 44 **(Chain 0)**
IEEE 802.11 n HT40 Channel Middle (2442MHz) = 43 **(Chain 0)**
IEEE 802.11 n HT40 Channel High (2462MHz) = 42 **(Chain 0)**
IEEE 802.11n HT40 Channel Low (2422MHz) = 44 **(Chain 1)**
IEEE 802.11 n HT40 Channel Middle (2442MHz) = 43 **(Chain 1)**
IEEE 802.11 n HT40 Channel High (2462MHz) = 42 **(Chain 1)**

(2) RX Mode：

Test Item packets RX
Start RX

(3) Normal Link Setup

1. Set up all computers like the setup diagram.
2. All of the function are under run.
3. Notebook PC (2) ping 192.168.0.10 –t to Notebook PC (1).
4. Notebook PC (1) ping 192.168.0.20 –t to Notebook PC (2).
5. Notebook PC (1) ping 192.168.0.50 –t to Wireless Access Point (3).

Start test.

8. APPLICABLE LIMITS AND TEST RESULTS

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

LIMIT

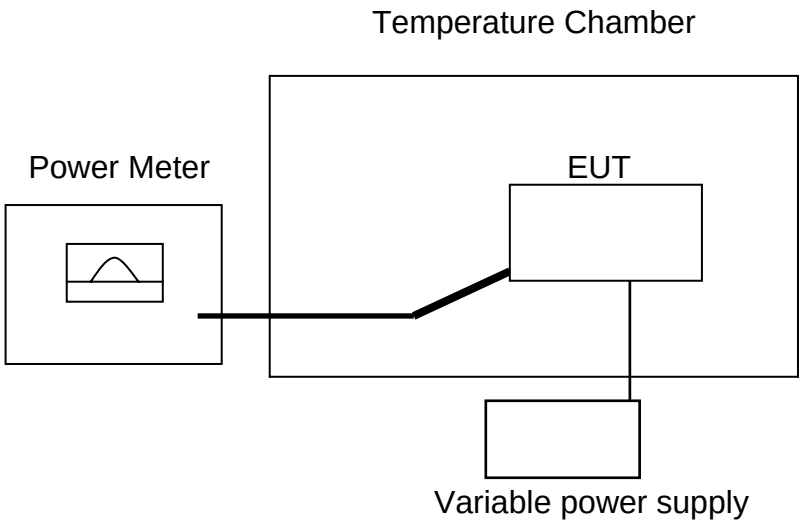
EN 300 328 Clause 4.3.1

The equivalent isotropic radiated power shall be equal to or less than -10 dBW (100 mW) e.i.r.p. This limit shall apply for any combination of power level and intended antenna assembly.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2012
Power Meter	Anritsu	ML2487A	6K00003888	MAY 30, 2012

TEST SETUP



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.6.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.7.2.2 for the measurement method.

TEST RESULTS

No non-compliance noted

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11b	TEMP& Humidity	22℃,51%

Duty Cycle measurement X: (Ton/Ton + Toff) =	1.00	
10 * log (1/x) =	0.00	dB
Antenna Assembly Gain:	3	dBi
Cable Loss=	0.5	dB

TEST CONDITIONS		TRANSMITTER POWER (dBm)									
		T_{nom} (25˚C)		T_{min} (0˚C)				T_{max} (55˚C)			
CHANNEL	Voltage / Power	230VAC		207VAC		253VAC		207VAC		253VAC	
		Chain0	Total	Chain0	Total	Chain0	Total	Chain0	Total	Chain0	Total
Low	Measured Power	13.02	16.52	14.98	18.48	14.84	18.34	11.74	15.24	11.51	15.01
	EIRP	16.52		18.48		18.34		15.24		15.01	
Middle	Measured Power	13.02	16.52	15.21	18.71	15.03	18.53	11.58	15.08	11.53	15.03
	EIRP	16.52		18.71		18.53		15.08		15.03	
High	Measured Power	12.59	16.09	14.83	18.33	14.72	18.22	10.89	14.39	11.26	14.76
	EIRP	16.09		18.33		18.22		14.39		14.76	
Limit		Average Limit = 20 dBm									
Measurement Uncertainty		+ 0.28dB / - 0.30dB									

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11g	TEMP& Humidity	22℃,51%

Duty Cycle measurement X: (Ton/Ton + Toff) =	1.00	
10 * log (1/x) =	0.00	dB
Antenna Assembly Gain:	3	dBi
Cable Loss=	0.5	dB

TEST CONDITIONS		TRANSMITTER POWER (dBm)									
		T_{nom} (25°C)		T_{min} (0°C)				T_{max} (55°C)			
CHANNEL	Voltage / Power	230VAC		207VAC		253VAC		207VAC		253VAC	
		Chain0	Total	Chain0	Total	Chain0	Total	Chain0	Total	Chain0	Total
Low	Measured Power	12.96	16.46	14.75	18.25	14.63	18.13	11.22	14.72	11.40	14.90
	EIRP	16.46		18.25		18.13		14.72		14.90	
Middle	Measured Power	12.58	16.08	14.62	18.12	14.57	18.07	10.91	14.41	10.82	14.32
	EIRP	16.08		18.12		18.07		14.41		14.32	
High	Measured Power	12.65	16.15	14.84	18.34	14.78	18.28	11.05	14.55	11.19	14.69
	EIRP	16.15		18.34		18.28		14.55		14.69	
Limit		Average Limit = 20 dBm									
Measurement Uncertainty		+ 0.28dB / - 0.30dB									

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11HT20	TEMP& Humidity	22℃,51%

Duty Cycle measurement X: (Ton/Ton + Toff) =	1.00	
10 * log (1/x) =	0.00	dB
Antenna Assembly Gain:	3	dBi
Cable Loss=	0.5	dB

TEST CONDITIONS		TRANSMITTER POWER (dBm)														
		T_{nom} (25°C)			T_{min} (0°C)						T_{max} (55°C)					
CHANNEL	Voltage / Power	230VAC			207VAC			253VAC			207VAC			253VAC		
		Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
Low	Measured Power	9.23	9.83	16.05	11.43	11.23	17.84	11.38	11.29	17.85	7.58	9.20	14.98	7.51	9.36	15.04
	EIRP	12.73	13.33		14.93	14.73		14.88	14.79		11.08	12.70		11.01	12.86	
Middle	Measured Power	9.01	9.52	15.78	11.70	11.70	18.21	11.58	11.67	18.14	7.48	9.52	15.13	7.39	9.61	15.15
	EIRP	12.51	13.02		15.20	15.20		15.08	15.17		10.98	13.02		10.89	13.11	
High	Measured Power	9.32	9.72	16.03	11.39	12.02	18.23	11.44	11.89	18.18	7.71	8.52	14.64	7.53	8.69	14.66
	EIRP	12.82	13.22		14.89	15.52		14.94	15.39		11.21	12.02		11.03	12.19	
Limit		Average Limit = 20 dBm														
Measurement Uncertainty		+ 0.28dB / - 0.30dB														

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11HT40	TEMP& Humidity	22℃,51%

Duty Cycle measurement X: (Ton/Ton + Toff) =	1.00	
10 * log (1/x) =	0.00	dB
Antenna Assembly Gain:	3	dBi
Cable Loss=	0.5	dB

TEST CONDITIONS		TRANSMITTER POWER (dBm)														
		T_{nom} (25 °C)			T_{min} (0 °C)			T_{max} (55 °C)								
CHANNEL	Voltage / Power	230VAC			207VAC			253VAC			207VAC			253VAC		
		Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
Low	Measured Power	9.42	9.59	16.02	11.44	11.33	17.90	11.52	11.34	17.94	8.95	7.48	14.79	8.78	7.69	14.78
	EIRP	12.92	13.09		14.94	14.83		15.02	14.84		12.45	10.98		12.28	11.19	
Middle	Measured Power	9.49	9.16	15.84	11.39	11.95	18.19	11.21	12.05	18.16	7.64	7.57	14.12	7.94	7.28	14.13
	EIRP	12.99	12.66		14.89	15.45		14.71	15.55		11.14	11.07		11.44	10.78	
High	Measured Power	9.32	9.32	15.83	11.53	12.23	18.40	11.63	12.00	18.33	7.64	8.01	14.34	7.36	8.12	14.27
	EIRP	12.82	12.82		15.03	15.73		15.13	15.50		11.14	11.51		10.86	11.62	
Limit		Average Limit = 20 dBm														
Measurement Uncertainty		+ 0.28dB / - 0.30dB														

8.2 MAXIMUM SPECTRAL POWER DENSITY

LIMIT

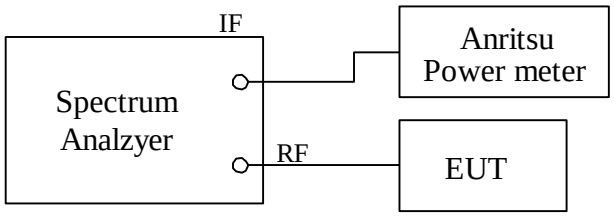
EN 300 328 Clause 4.3.2.2

For wide band modulations other then FHSS (e.g. DSSS, OFDM, etc.), the maximum spectrum power density is limited to 10 mW per MHz e.i.r.p.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2012
Power Meter	Anritsu	ML2487A	6K00003888	MAY 30, 2012

TEST SETUP



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN300 328 (V1.7.1) clause 5.7.3 for the measurement method.

TEST RESULTS

No non-compliance noted

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Mode	IEEE 802.11b	TEMP & Humidity	22℃,51%

TEST CONDITIONS		Measured Power Density Reading (A) Chain 0	Antenna Gain (B)	10*log (1/x) (C)	Cable loss (D)	Measured Power Density Result (A+B+C+D)
Measured Power Density	Low (dBm/MHz)	0.49	3.00	0.00	1.50	4.99
	Mid (dBm/MHz)	0.42				4.92
	High (dBm/MHz)	0.43				4.93
Limit		10 dBm / MHz				
Measurement Uncertainty		+1.5dB / -1.4dB				

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Mode	IEEE 802.11g	TEMP & Humidity	22℃,51%

TEST CONDITIONS		Measured Power Density Reading Chain 0 (A)	Antenna Gain (B)	10*log (1/x) (C)	Cable loss (D)	Measured Power Density Result (A+B+C+D)
Measured Power Density	Low (dBm/MHz)	0.50	3.00	0.00	1.50	5.00
	Mid (dBm/MHz)	0.48				4.98
	High (dBm/MHz)	0.44				4.94
Limit		10 dBm / MHz				
Measurement Uncertainty		+1.5dB / -1.4dB				

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Mode	IEEE 802.11n HT20	TEMP & Humidity	22℃,51%

TEST CONDITIONS		Measured Power Density Reading(A0) ChainA	Measured Power Density Reading(A1) ChainC	Antenna Gain (B)	10*log (1/x) (C)	Cable loss (D)	Measured Power Density Result (A0+B+C+D) Chain0	Measured Power Density Result (A1+B+C+D) Chain1	Measured Power Density Result Total (ch0+ch1+ch2)
Measured Power Density	Low (dBm/MHz)	-2.48	-2.43	3.00	0.00	1.50	2.02	2.07	5.06
	Mid (dBm/MHz)	-2.56	-2.59				1.94	1.91	4.94
	High (dBm/MHz)	-2.67	-2.82				1.83	1.68	4.77
Limit		10 dBm / MHz							
Measurement Uncertainty		+1.5dB / -1.4dB							

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Mode	IEEE 802.11n HT40	TEMP & Humidity	22℃,51%

TEST CONDITIONS		Measured Power Density Reading(A0) ChainA	Measured Power Density Reading(A1) ChainC	Antenna Gain (B)	10*log (1/x) (C)	Cable loss (D)	Measured Power Density Result (A0+B+C+D) Chain0	Measured Power Density Result (A1+B+C+D) Chain1	Measured Power Density Result Total (ch0+ch1+ch2)
Measured Power Density	Low (dBm/MHz)	-2.90	-2.83	3.00	0.00	1.50	1.60	1.67	4.65
	Mid (dBm/MHz)	-2.93	-2.97				1.57	1.53	4.56
	High (dBm/MHz)	-2.88	-2.94				1.62	1.56	4.60
Limit		10 dBm / MHz							
Measurement Uncertainty		+1.5dB / -1.4dB							

8.3 FREQUENCY RANGE

LIMIT

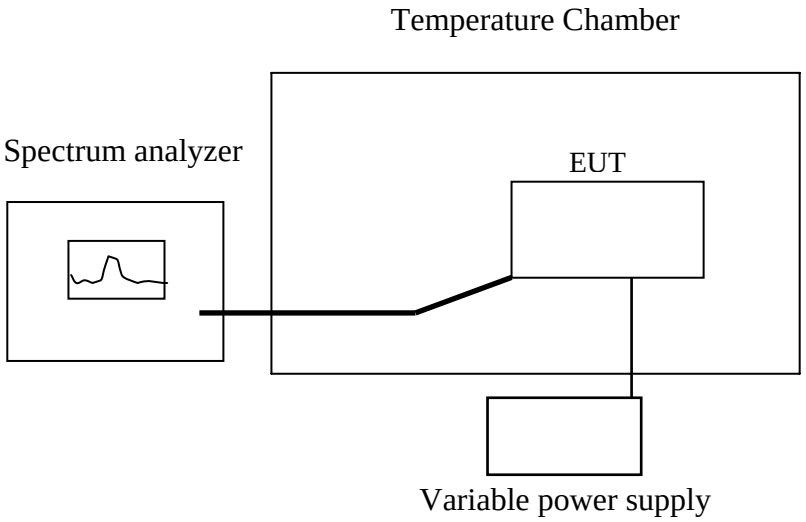
EN 300 328 Clause 4.3.3.2

For all equipment the frequency shall lie within the band 2.4GHz to 2.4835GHz (fL>2.4GHz and fH<2.4835GHz)

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29, 2012
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2012

TEST SETUP



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN300 328 (V1.7.1) clause 5.7.4 for the measurement method.

TEST RESULTS

No non-compliance noted

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Mode	IEEE 802.11b	TEMP & Humidity	22℃,51%

TEST CONDITIONS		Frequency Range	
		Low Frequency	High Frequency
		MHz	MHz
T_{nom} (25 °C)	230V	2402.63	2480.64
T_{min} (0 °C)	207V	2402.53	2480.79
	253V	2402.52	2480.79
T_{max} (55 °C)	207V	2402.72	2480.59
	253V	2402.71	2480.60
Measured frequencies (lowest and highest)		2402.52	2480.79
Limit		FL > 2400MHz	FH < 2483.5MHz
Measurement uncertainty		+/- 120kHz	

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Mode	IEEE 802.11g	TEMP & Humidity	22℃,51%

TEST CONDITIONS		Frequency Range	
		Low Frequency	High Frequency
		MHz	MHz
T_{nom} (25 °C)	230V	2402.64	2481.38
T_{min} (0 °C)	207V	2402.53	2481.54
	253V	2402.53	2481.53
T_{max} (55 °C)	207V	2402.73	2481.24
	253V	2402.73	2481.24
Measured frequencies (lowest and highest)		2402.53	2481.54
Limit		FL > 2400MHz	FH < 2483.5MHz
Measurement uncertainty		+/- 120kHz	

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Mode	IEEE 802.11n HT20	TEMP & Humidity	22℃,51%

TEST CONDITIONS		Frequency Range			
		Low Frequency(MHz)		High Frequency(MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
T_{nom} (25 °C)	230V	2402.65	2402.64	2481.39	2481.40
T_{min} (0 °C)	207V	2402.53	2402.54	2481.54	2481.55
	253V	2402.52	2402.53	2481.55	2481.53
T_{max} (55 °C)	207V	2402.71	2402.69	2481.29	2481.27
	253V	2402.73	2402.70	2481.28	2481.26
Measured frequencies (lowest and highest)		**2402.52**	**2402.53**	**2481.55**	**2481.55**
Limit		FL > 2400MHz		FH < 2483.5MHz	
Measurement uncertainty		+/- 120kHz			

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Mode	IEEE 802.11n HT40	TEMP & Humidity	22℃,51%

TEST CONDITIONS		Frequency Range			
		Low Frequency(MHz)		High Frequency(MHz)	
		Chain 0		Chain 0	
T_{nom} (25 °C)	230V	2403.58	2403.59	2480.45	2480.45
T_{min} (0 °C)	207V	2403.43	2403.42	2480.53	2480.63
	253V	2403.43	2403.43	2480.54	2480.63
T_{max} (55 °C)	207V	2403.55	2403.56	2480.38	2480.38
	253V	2403.56	2403.55	2480.38	2480.38
Measured frequencies (lowest and highest)		**2403.43**	**2403.42**	**2480.54**	**2480.63**
Limit		FL > 2400MHz		FH < 2483.5MHz	
Measurement uncertainty		+/- 120kHz			

8.4 TRANSMITTER SPURIOUS EMISSIONS

LIMIT

ETSI EN 300 328 Subclause 4.3.4.2 limits : The spurious emissions of the transmitter shall not exceed the values in tables 2 and 3 in the indicated bands.

Table 2: Transmitter limits for Narrowband Spurious emissions

Frequency Range	Limit when operating	Limit when in standby
30MHz to 1 GHz	-36 dBm	-57 dBm
above 1 GHz to 12.75 GHz	-30 dBm	-47 dBm
1.8 GHz to 1.9 GHz 5.15 GHz to 5.3 GHz	-47 dBm	-47 dBm

Table 3: Transmitter limits for Wideband Spurious emissions

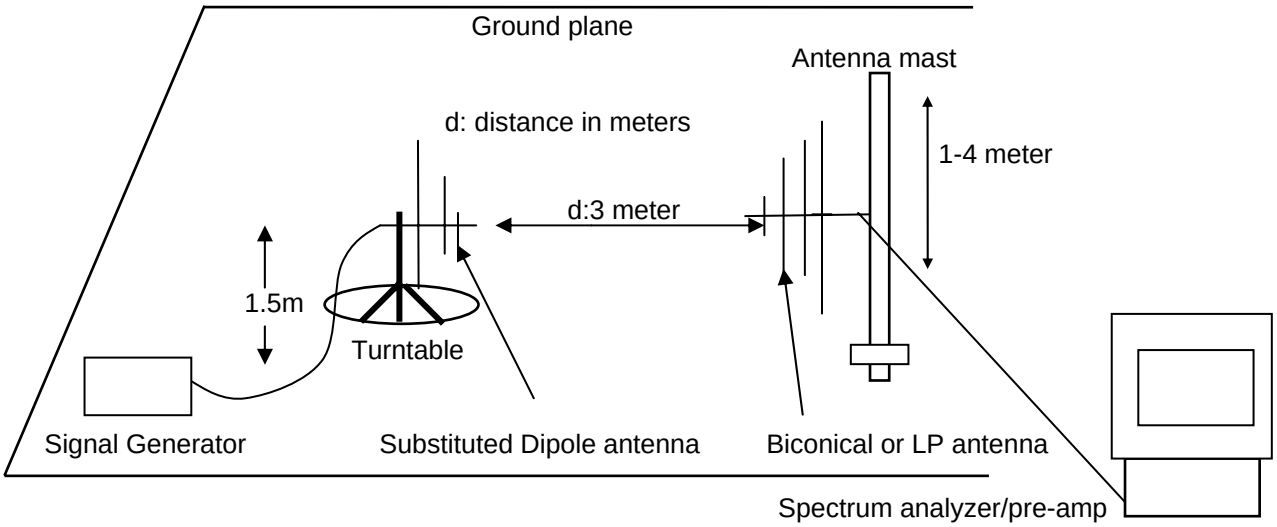
Frequency Range	Limit when operating	Limit when in standby
30MHz to 1 GHz	-86 dBm/Hz	-107 dBm/Hz
above 1 GHz to 12.75 GHz	-80 dBm/Hz	-97 dBm/Hz
1.8 GHz to 1.9 GHz 5.15 GHz to 5.3 GHz	-97 dBm/Hz	-97 dBm/Hz

TEST EQUIPMENTS

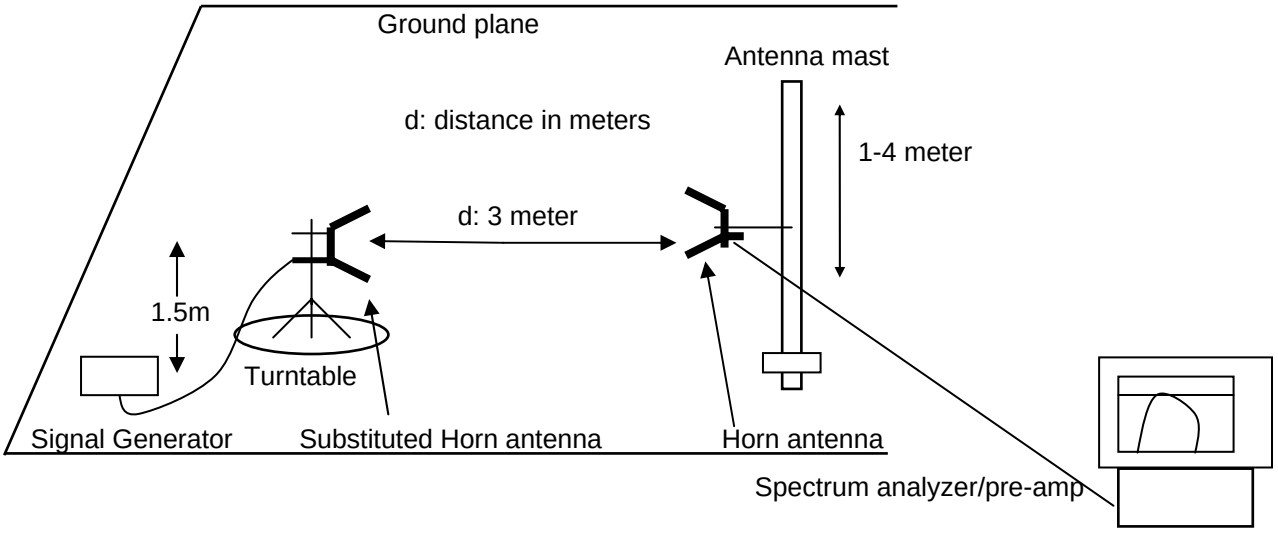
Open Area Test Site # 6				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
TYPE N COAXIAL CABLE	SUHNER	CHA9513	6	NOV. 17, 2012
BI-LOG Antenna	Sunol	JB1	A070506-2	OCT. 03, 2012
LOOP ANTENNA	EMCO	6502	8905-2356	JUN. 10, 2012
Pre-Amplifier	HP	8447F	2944A03817	NOV. 23, 2012
EMI Receiver	R&S	ESVS10	833206/012	MAY 10, 2012
RF Cable	SUHNER	SUCOFLEX104PEA	20520/4PEA	NOV. 10, 2012
Horn Antenna	Com-Power	AH-118	071032	DEC. 27, 2011
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29,2012
Pre-Amplifier	MITEQ	AFS44-00108650-42-10P-44	1205908	NOV. 23, 2012
3116 Double Ridge Antenna (40G)	ETS-LINDGREN	EMCO-003	00078	NOV. 14, 2012
Turn Table	Yo Chen	001	----------	N.C.R.
Antenna Tower	AR	TP1000A	309874	N.C.R.
Controller	CT	SC101	----------	N.C.R.
RF Swicth	E-INSTRUMENT TELH LTD	ERS-180A	EC1204141	N.C.R
Power Meter	Anritsu	ML2487A	6K00003888	MAY 30, 2012
Power Sensor	Anritsu	MA2491A	33265	MAY 30.2012
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2012
Signal Generator	HP	8673C	2938A00663	SEP. 12, 2012
DC Power Source	LOKO	DSP-5050	L1507009282	N.C.R

TEST SETUP

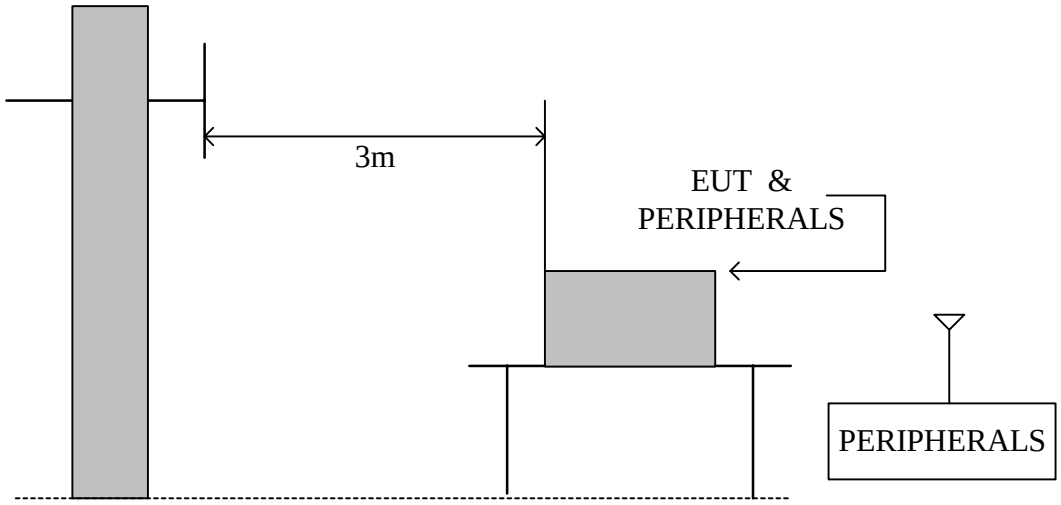
Substitution Measurement setup below 1GHz



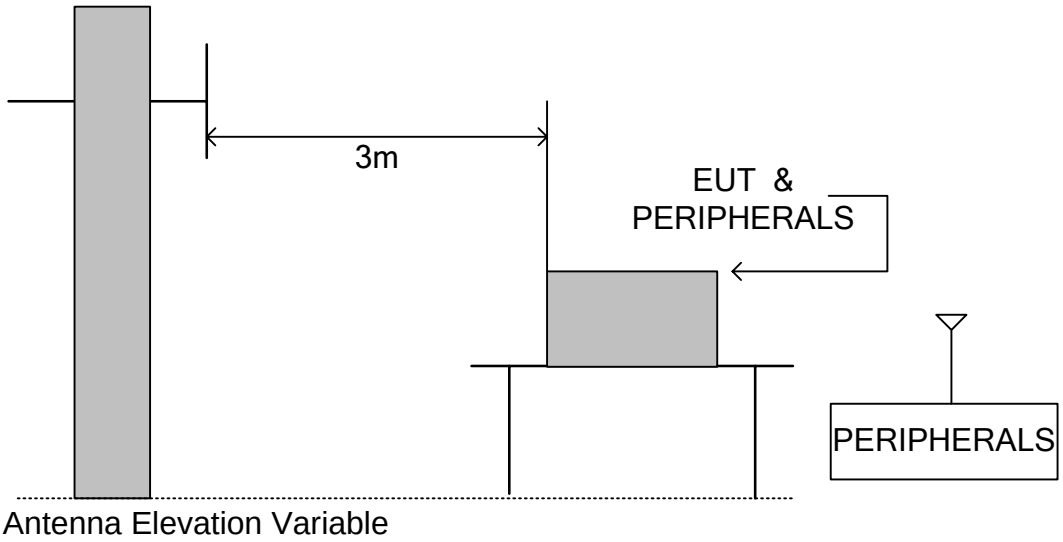
Substitution Measurement setup above 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.

2. Please refer to ETSI EN300 328 (V1.7.1) clause 5.7.5 for the measurement method.

TEST RESULTS

No non-compliance noted

Below 1GHz

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	TX / CH Low	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
110.48	53.24	H	-60.00	-36.00	-24.00	-4.09
249.99	40.67	H	-71.52	-36.00	-35.52	-3.04
312.43	42.19	H	-68.30	-36.00	-32.30	-1.34
468.50	46.73	H	-59.78	-36.00	-23.78	2.64
500.12	45.98	H	-60.30	-36.00	-24.30	2.87
937.15	39.52	H	-58.80	-36.00	-22.80	10.83
52.14	62.74	V	-53.32	-36.00	-17.32	-6.91
110.39	56.48	V	-53.21	-36.00	-17.21	-0.54
250.12	46.06	V	-64.03	-36.00	-28.03	-0.94
371.25	42.11	V	-65.64	-36.00	-29.64	1.40
500.02	40.81	V	-62.69	-36.00	-26.69	5.65
937.46	37.26	V	-57.98	-36.00	-21.98	13.91

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. According to technical experiences, all spurious emissions at all channels are almost the same below 1GHz, so that the channel low was chosen as representative for the test.

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	TX / CH High	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
110.23	55.43	H	-57.81	-36.00	-21.81	-4.09
250.16	41.69	H	-70.46	-36.00	-34.46	-3.00
312.02	43.18	H	-67.31	-36.00	-31.31	-1.34
468.75	44.32	H	-62.19	-36.00	-26.19	2.64
500.00	46.50	H	-59.78	-36.00	-23.78	2.87
937.50	39.16	H	-59.16	-36.00	-23.16	10.83
52.25	63.24	V	-52.82	-36.00	-16.82	-6.91
110.25	53.62	V	-56.07	-36.00	-20.07	-0.54
250.32	45.84	V	-64.25	-36.00	-28.25	-0.94
372.15	41.25	V	-66.47	-36.00	-30.47	1.43
500.01	40.00	V	-63.50	-36.00	-27.50	5.65
937.14	37.35	V	-57.89	-36.00	-21.89	13.91

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. According to technical experiences, all spurious emissions at all channels are almost the same below 1GHz, so that the channel low was chosen as representative for the test.

Above 1GHz

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11b / TX (CH Low)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4824.12	49.51	H	-53.24	-30.00	-23.24	6.40
6432.03	48.78	H	-51.13	-30.00	-21.13	9.24
4824.16	50.39	V	-53.62	-30.00	-23.62	5.14
6431.98	49.76	V	-51.16	-30.00	-21.16	8.23

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11b / TX (CH High)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4944.52	49.27	H	-53.07	-30.00	-23.07	6.81
6593.23	46.08	H	-53.11	-30.00	-23.11	9.96
4944.12	48.14	V	-55.54	-30.00	-25.54	5.47
6593.57	46.33	V	-53.88	-30.00	-23.88	8.94

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11g / TX (CH Low)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4824.16	50.16	H	-52.59	-30.00	-22.59	6.40
6432.09	49.25	H	-50.66	-30.00	-20.66	9.24
4824.13	50.83	V	-53.18	-30.00	-23.18	5.14
6431.98	50.01	V	-50.91	-30.00	-20.91	8.23

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11g / TX (CH High)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4944.37	49.73	H	-52.61	-30.00	-22.61	6.81
6593.52	46.22	H	-52.97	-30.00	-22.97	9.96
4944.12	49.18	V	-54.50	-30.00	-24.50	5.47
4593.26	47.14	V	-57.50	-30.00	-27.50	4.51

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802.11n HT20 / TX (CH Low)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4824.24	50.16	H	-52.59	-30.00	-22.59	6.40
6432.08	48.97	H	-50.94	-30.00	-20.94	9.24
4824.17	52.10	V	-51.91	-30.00	-21.91	5.14
6431.99	49.64	V	-51.28	-30.00	-21.28	8.23

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11n HT20 / TX (CH High)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4944.38	49.61	H	-52.73	-30.00	-22.73	6.81
6594.02	46.42	H	-52.77	-30.00	-22.77	9.96
4944.16	48.78	V	-54.90	-30.00	-24.90	5.47
6593.89	47.05	V	-53.16	-30.00	-23.16	8.94

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11n HT40 / TX (CH Low)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4844.60	48.67	H	-54.01	-30.00	-24.01	6.47
6458.33	46.55	H	-53.31	-30.00	-23.31	9.29
4844.60	50.12	V	-53.84	-30.00	-23.84	5.19
6458.33	48.84	V	-52.03	-30.00	-22.03	8.28

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11n HT40 / TX (CH High)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4924.18	49.59	H	-52.82	-30.00	-22.82	6.74
6565.33	46.27	H	-53.09	-30.00	-23.09	9.79
4924.47	48.40	V	-55.34	-30.00	-25.34	5.41
6565.33	45.18	V	-55.20	-30.00	-25.20	8.77

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

8.5 RECEIVER SPURIOUS EMISSIONS

LIMIT

ETSI EN 300 328 Subclause 4.3.5.2 Limits : The spurious emissions of the receiver shall not exceed the values in table 4 and 5 in the indicated bands.

Table 4: Narrowband spurious emission limits for receivers

Frequency Range	Limit
30MHz to 1 GHz	-57 dBm
above 1 GHz to 12.75 GHz	-47 dBm

Table 5: Wideband spurious emission limits for receivers

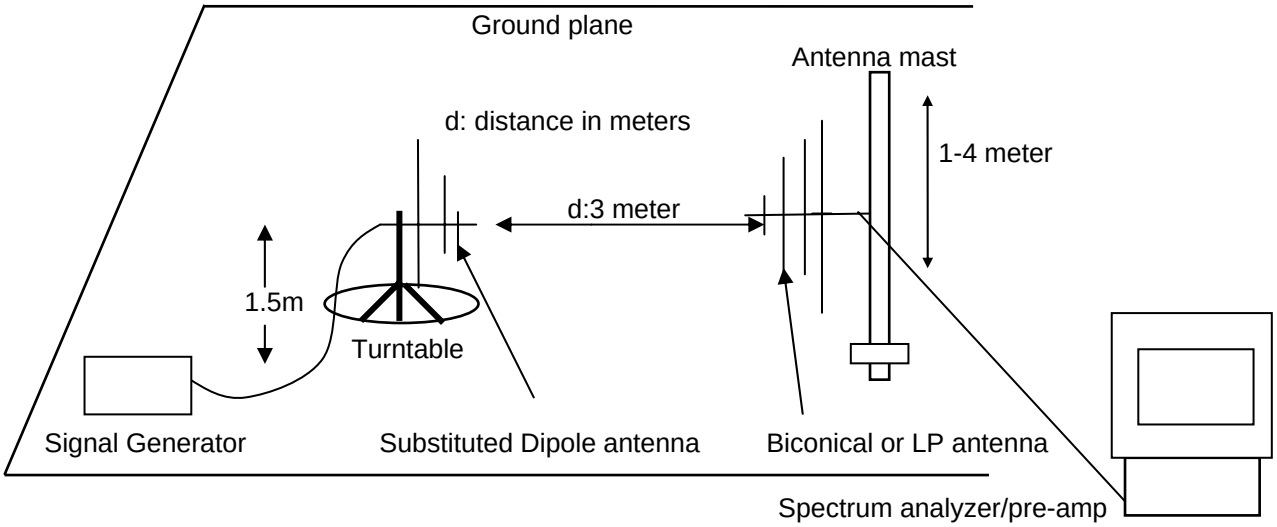
Frequency Range	Limit
30MHz to 1 GHz	-107 dBm/Hz
above 1 GHz to 12.75 GHz	-97 dBm/Hz

TEST EQUIPMENTS

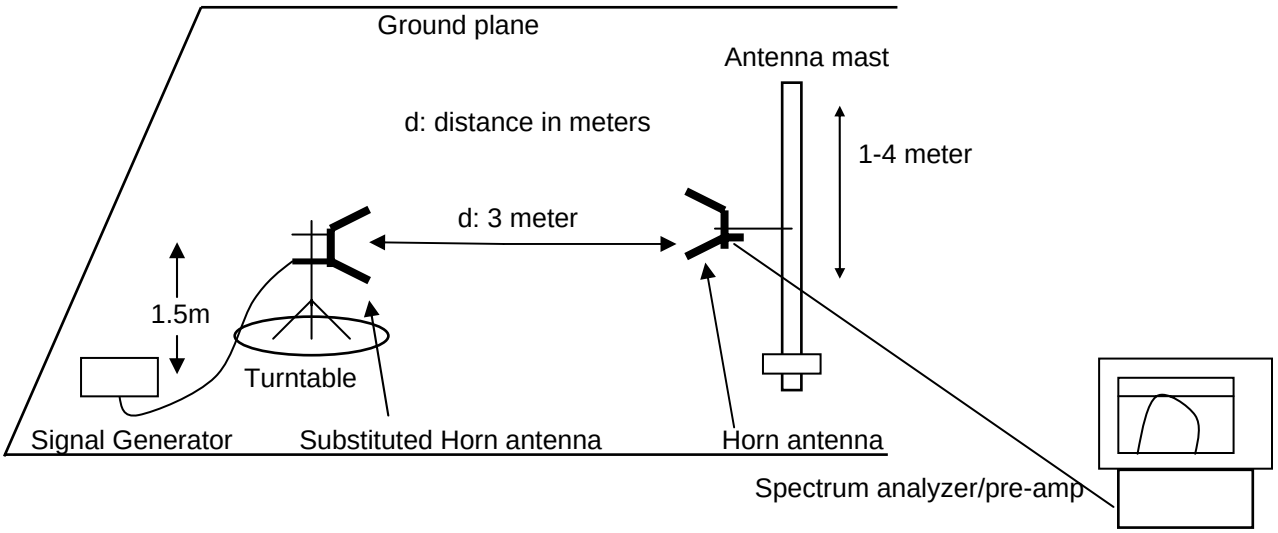
Open Area Test Site # 6				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
TYPE N COAXIAL CABLE	SUHNER	CHA9513	6	NOV. 17, 2012
BI-LOG Antenna	Sunol	JB1	A070506-2	OCT. 03, 2012
LOOP ANTENNA	EMCO	6502	8905-2356	JUN. 10, 2012
Pre-Amplifier	HP	8447F	2944A03817	NOV. 23, 2012
EMI Receiver	R&S	ESVS10	833206/012	MAY 10, 2012
RF Cable	SUHNER	SUCOFLEX104PEA	20520/4PEA	NOV. 10, 2012
Horn Antenna	Com-Power	AH-118	071032	DEC. 27, 2011
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29,2012
Pre-Amplifier	MITEQ	AFS44-00108650-42-10P-44	1205908	NOV. 23, 2012
3116 Double Ridge Antenna (40G)	ETS-LINDGREN	EMCO-003	00078	NOV. 14, 2012
Turn Table	Yo Chen	001	----------	N.C.R.
Antenna Tower	AR	TP1000A	309874	N.C.R.
Controller	CT	SC101	----------	N.C.R.
RF Swicth	E-INSTRUMENT TELH LTD	ERS-180A	EC1204141	N.C.R
Power Meter	Anritsu	ML2487A	6K00003888	MAY 30, 2012
Power Sensor	Anritsu	MA2491A	33265	MAY 30.2012
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2012
Signal Generator	HP	8673C	2938A00663	SEP. 12, 2012
DC Power Source	LOKO	DSP-5050	L1507009282	N.C.R

TEST SETUP

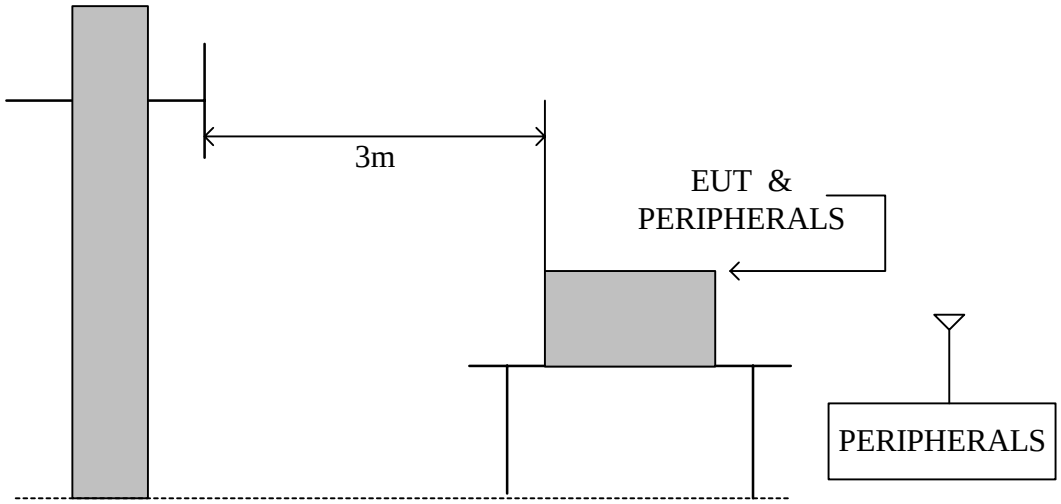
Substitution Measurement setup below 1GHz



Substitution Measurement setup above 1GHz

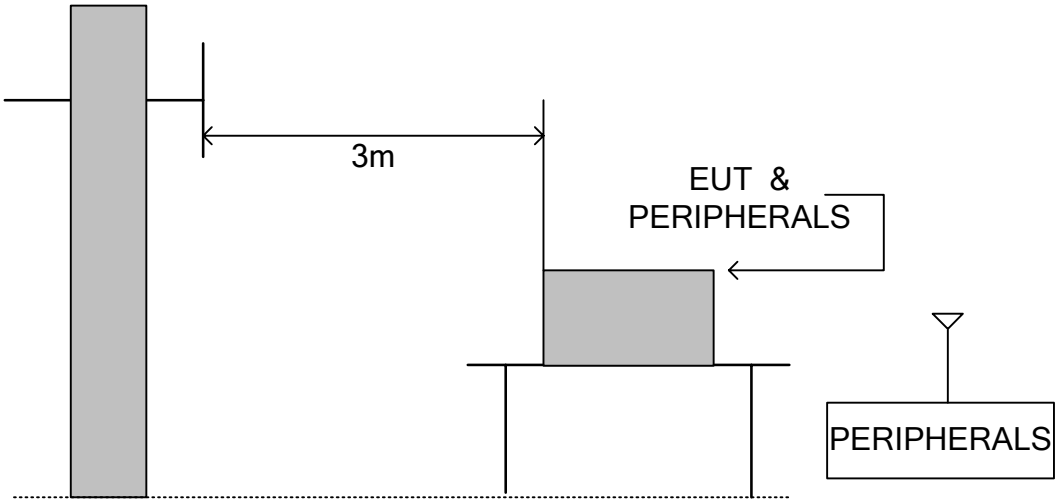


The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



Antenna Elevation Variable

The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Antenna Elevation Variable

TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN300 328 (V1.7.1) clause 5.7.6 for the measurement method.

TEST RESULTS

No non-compliance noted

Below 1GHz

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	RX / CH Low	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
110.77	49.95	H	-63.29	-57.00	-6.29	-4.09
250.00	35.98	H	-76.17	-57.00	-19.17	-3.00
312.42	37.68	H	-72.81	-57.00	-15.81	-1.34
468.75	41.24	H	-65.27	-57.00	-8.27	2.64
500.00	41.33	H	-64.95	-57.00	-7.95	2.87
937.51	34.40	H	-63.92	-57.00	-6.92	10.83
51.10	57.85	V	-58.82	-57.00	-1.82	-7.52
111.31	51.29	V	-58.34	-57.00	-1.34	-0.48
250.00	39.42	V	-70.67	-57.00	-13.67	-0.94
371.24	37.29	V	-70.46	-57.00	-13.46	1.40
500.00	35.66	V	-67.84	-57.00	-10.84	5.65
937.51	32.34	V	-62.90	-57.00	-5.90	13.91

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. According to technical experiences, all spurious emissions at all channels are almost the same below 1GHz, so that the channel low was chosen as representative for the test.

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	RX / CH High	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
110.83	50.08	H	-63.16	-57.00	-6.16	-4.09
250.13	36.57	H	-75.58	-57.00	-18.58	-3.00
312.43	38.29	H	-72.20	-57.00	-15.20	-1.34
468.74	41.36	H	-65.15	-57.00	-8.15	2.64
500.01	42.45	H	-63.83	-57.00	-6.83	2.87
937.49	35.15	H	-63.17	-57.00	-6.17	10.83
52.05	58.48	V	-57.58	-57.00	-0.58	-6.91
110.32	51.62	V	-58.07	-57.00	-1.07	-0.54
250.25	40.18	V	-69.91	-57.00	-12.91	-0.94
372.00	37.53	V	-70.19	-57.00	-13.19	1.43
500.03	36.18	V	-67.32	-57.00	-10.32	5.65
937.52	33.73	V	-61.51	-57.00	-4.51	13.91

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. According to technical experiences, all spurious emissions at all channels are almost the same below 1GHz, so that the channel low was chosen as representative for the test.

Above 1GHz

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11b / RX (CH Low)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4824.10	46.10	H	-56.65	-47.00	-9.65	6.40
6432.13	46.31	H	-53.60	-47.00	-6.60	9.24
4824.11	47.18	V	-56.83	-47.00	-9.83	5.14
6432.13	48.17	V	-52.75	-47.00	-5.75	8.23

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11b / RX (CH High)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4944.09	47.52	H	-54.82	-47.00	-7.82	6.81
6592.13	44.50	H	-54.69	-47.00	-7.69	9.96
4944.10	46.72	V	-56.96	-47.00	-9.96	5.47
6592.13	44.70	V	-55.51	-47.00	-8.51	8.94

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11g / RX (CH Low)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4824.10	46.33	H	-56.42	-47.00	-9.42	6.40
6432.14	46.21	H	-53.70	-47.00	-6.70	9.24
4824.12	46.98	V	-57.03	-47.00	-10.03	5.14
6432.13	47.39	V	-53.53	-47.00	-6.53	8.23

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11g / RX (CH High)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4943.99	48.17	H	-54.17	-47.00	-7.17	6.81
6592.03	44.54	H	-54.65	-47.00	-7.65	9.96
4944.18	46.84	V	-56.84	-47.00	-9.84	5.47
6592.16	45.06	V	-55.15	-47.00	-8.15	8.94

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11n HT20 / RX (CH Low)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4824.12	45.85	H	-56.90	-47.00	-9.90	6.40
6432.15	47.08	H	-52.83	-47.00	-5.83	9.24
4824.11	48.39	V	-55.62	-47.00	-8.62	5.14
6432.25	49.02	V	-51.90	-47.00	-4.90	8.23

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11n HT20 / RX (CH High)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4944.17	47.53	H	-54.81	-47.00	-7.81	6.81
6592.19	46.67	H	-52.52	-47.00	-5.52	9.96
4944.08	48.73	V	-54.95	-47.00	-7.95	5.47
6592.16	45.36	V	-54.85	-47.00	-7.85	8.94

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11n HT40 / RX (CH Low)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4844.05	46.26	H	-56.42	-47.00	-9.42	6.47
6458.35	45.98	H	-53.88	-47.00	-6.88	9.29
4844.58	46.88	V	-57.08	-47.00	-10.08	5.19
6458.20	47.07	V	-53.80	-47.00	-6.80	8.28

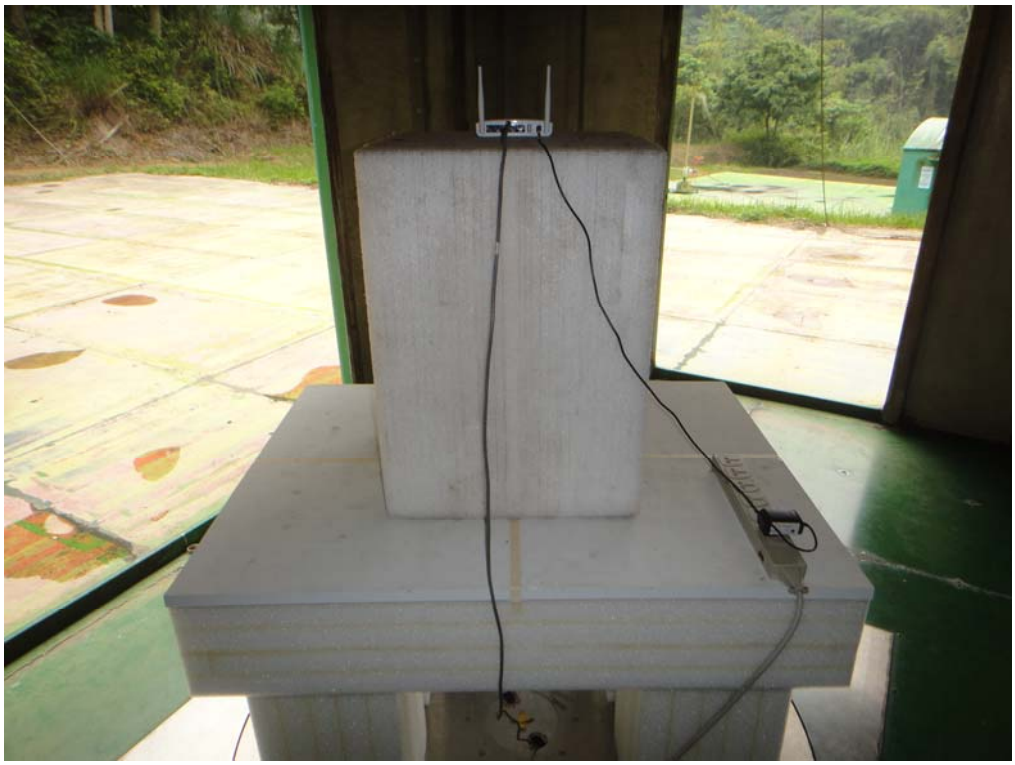
Product Name	Smart 300N Broadband Router	Test Date	2011/12/15
Model	BR485d	Test By	Agun Huang
Test Mode	IEEE 802. 11n HT40 / RX (CH High)	TEMP& Humidity	22℃, 51%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
4924.16	47.00	H	-55.41	-47.00	-8.41	6.74
6565.34	45.61	H	-53.75	-47.00	-6.75	9.79
4924.82	47.49	V	-56.25	-47.00	-9.25	5.41
6565.33	45.12	V	-55.26	-47.00	-8.26	8.77

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

APPENDIX I PHOTOGRPHS OF TEST SETUP



ETSI EN 301 489-17 V2.1.1: 2009

TEST REPORT

For

Smart 300N Broadband Router

Model Number: BR485d

Brand : E-TOP

Issued to

E-TOP Network Technology Inc.

No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
Tainan Lab.
No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
TEL: 886-6-580-2201
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Date of Issue: February 08, 2012

Testing Laboratory
1109

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	February 08, 2012	Initial Issue	ALL	Sunny Chang

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APPENDIX 2 PHOTOGRAPHS OF EUT....A1

1. TEST RESULT CERTIFICATION

Applicant	:	E-Top Network Technology Inc.
Address	:	No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.
Manufacture	:	E-Top Network Technology Inc.
Address	:	No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.
Equipment Under Test	:	Smart 300N Broadband Router
Model Number	:	BR485d
Brand Name	:	E-TOP
Date of Test	:	November 22, 2011 ~ December 14, 2011

APPLICABLE STANDARDS		
STANDARD	**TEST RESULT**	
ETSI EN 301 489-17 V2.1.1: 2009	No non-compliance noted	
Applicable Standard	**Class/Limit/Criterion**	**Test Result**
ETSI EN 301 489-1 V1.8.1: 2008		
EN 55022: 2006+A1: 2007	Class B	No non-compliance noted
EN 61000-3-3: 2008	Limit	No non-compliance noted
EN 61000-4-2: 2009	Transient Phenomena	No non-compliance noted
EN 61000-4-3: 2006+A1: 2008	Continuous Phenomena	No non-compliance noted
EN 61000-4-4: 2004	Transient Phenomena	No non-compliance noted
EN 61000-4-5: 2006	Transient Phenomena	No non-compliance noted
EN 61000-4-6: 2009	Continuous Phenomena	No non-compliance noted
EN 61000-4-11: 2004	Transient Phenomena: **>95% reduction 10ms** Transient Phenomena: **0% reduction 20ms** Transient Phenomena: **30% reduction 500ms** By User Recoverable Phenomena: **>95% reduction 5000ms**	No non-compliance noted
Deviation from Applicable Standard		
None		

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in ETSI EN 301 489-17 V2.1.1: 2009. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Jeter Wu
Assistant Manager

Reviewed by:

Eric Huang
Assistant Section Manager

2. EUT DESCRIPTION

Product Name	Smart 300N Broadband Router
Model Number	BR485d
Brand Name	E-TOP
Received Date	November 28, 2011
Frequency Range	IEEE 802.11b/g ,802.11n HT20 : 2412MHz ~ 2472MHz IEEE 802.11n HT40 : 2422MHz ~ 2462MHz IEEE 802.11a, 802.11n HT20 : 5180MHz ~ 5240MHz IEEE 802.11n HT40 : 5190MHz ~ 5230MHz
Transmit Power	IEEE 802.11b : 18.71 dBm IEEE 802.11g : 18.34 dBm IEEE 802.11n HT20 : 18.23 dBm IEEE 802.11n HT40 : 18.40 dBm IEEE 802.11a : 11.64 dBm IEEE 802.11n HT20 : 12.28 dBm IEEE 802.11n HT40 : 11.03 dBm
Channel Spacing	IEEE 802.11b/g, 802.11n HT20/HT40 : 5MHz IEEE 802.11n HT40 : 20MHz IEEE 802.11a, 802.11n HT20 : 20MHz IEEE 802.11n HT40 : 20MHz
Channel Number	IEEE 802.11b/g, 802.11n HT20 :13 Channels IEEE 802.11n HT40 : 9 Channels IEEE 802.11a, 802.11n HT20 : 4 Channels IEEE 802.11HT40 : 3 Channels
Transmit Data Rate	IEEE 802.11a : 54, 48 ,36, 24, 18, 12, 9, 6 Mbps IEEE 802.11b：11, 5.5, 2, 1 Mbps IEEE 802.11g：54, 48 ,36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20 : 130,117,104,78, 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mbps IEEE 802.11n HT40 : 300, 270,243, 216,162 ,135, 121.5, 108, 81, 54, 40.5, 27, 13.5 Mbps
Type of Modulation	IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11a : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	**Two antennas (2TX2RX)** Manufacture: YONG-SHUN TECH. CO., LTD. Type: Co-linear dipole structure Model: AN-152RRSU00 Gain: 3dBi for 2.4GHz, 4dBi for 5GHz Connector: Reverse SMA PLUG

Power Source	**Powered from adapter** Model: JKY36-SP1201000 Input: 100-240Vac, 50/60Hz, 0.5A Output: 12Vdc, 1000mA
Temperature Range	0 ~ +40℃

NOTE: 1. Client consigns one model sample and two adapters to test (Model Number: **BR485d**). Therefore, the testing Lab. just guarantees the unit, which has been tested.

2. For more details, please refer to the User's manual of the EUT.

3. To add a series model is for business necessary. The different of the each model is shown as bellows:

Multiple listing:

Company Name/Address	Brand name	Model	Product Name
E-Top Network Technology Inc. No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.	E-TOP	BR485d	Smart 300N Broadband Router
Sapido Technology Inc. No. 383., Sec. 2, Minsheng Rd., West Central District, Tainan 700, Taiwan, R.O.C.	SAPIDO	RB-1830	Smart 300Mbps Dualband Router - All Broadbands

3. TEST METHODOLOGY

All tests were performed in accordance with the procedure documented in ETSI EN 301 489-1 V1.6.1 (2005-09) as referenced in ETSI EN 301 489-17 V1.2.1 (2002-04).

3.1 UNIT OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the Spectrum analyzers were converted to dB (uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

The field strength is calculated by adding the Antenna Factor and Cable Factors and subtracting the Amplifier Gain from the measured reading. The following is a sample calculation:

FS = RA + AF + CF – AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB are added. The Amplifier Gain of 29 dB is subtracted, giving field strength of 32 dBuV/m. The 32-dBuV/m values was mathematically converted to its corresponding level in uV/m.

FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBuV/m

Note: Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

3.2 ANTENNA

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 10 meters from the leading edge of the turntable.

3.3 MEASUREMENT EQUIPMENT USED

Open Area Test Site # 7				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
TEST RECEIVER	Rohde & Schwarz	ESCS30	100343	DEC. 06, 2012
TYPE N COAXIAL CABLE	SUHNER	RG_214_U/2X	7	NOV. 24, 2012
BILOG ANTENNA	Sunol sciences	JB1	A013105-1	OCT. 05, 2012
Test Software	EMI e-3 / AUDIX (5.04211c)			

Above 1GHz Used				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
RF Cable	SUHNER	SUCOFLEX104PEA	20520/4PEA	NOV. 10, 2012
Horn Antenna	Com-Power	AH-118	071032	DEC. 27, 2012
Spectrum Analyzer	R&S	FSEK 30	835253/002	JUL. 14, 2012
Pre-Amplifier	MITEQ	AFS44-00108650-42-10P-44	1205908	NOV. 23, 2012
Turn Table	Yo Chen	001	----------	N.C.R.
Antenna Tower	AR	TP1000A	309874	N.C.R.
Controller	CT	SC101	----------	N.C.R.
RF Swicth	E-INSTRUMENT TELH LTD	ERS-180A	EC1204141	N.C.R
Test Software	e-3 (5.04303e)			

Remark: Each piece of equipment is scheduled for calibration once a year.

Conducted Emission room				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
L.I.S.N	SCHWARZBECK	NNLK 8130	8130124	Sep. 25, 2012
	Rohde & Schwarz	ESH 3-Z5	840062/021	Aug. 02, 2012
TEST RECEIVER	Rohde & Schwarz	ESCS 30	100348	JUL. 03, 2012
TYPE N COAXIAL CABLE	CCS	BNC50	11	OCT. 30, 2012
Test S/W	e-3 (5.04211c) R&S (2.27)			

Power Harmonic & Voltage Fluctuation/Flicker Measurement (EN 61000-3-2&-3-3)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Harmonics Analyzer	TTI	HA1600	198202	APR. 11, 2012
Test S/W	H/F HA 1600 PC LINK Field Probe			

Equipment Used for Immunity Measurement

ESD Test Site (IEC/EN 61000-4-2)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
ESD Simulator	NoiseKen	ESS-2002	ESS04Z3762	OCT. 10, 2012

Radiated Electromagnetic Field Immunity Test Site (IEC/EN 61000-4-3)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Computer	SYNNEX	BTO -LMIW300 - GB	A41202-0031	N.C.R.
LCD Monitor	Acer	AL1715sm	ETL13071994430 2366RH01	N.C.R.
Keyboard	SYNNEX	5211A	G4430091266	N.C.R.
Amplifier Freq. Range :80MHz ~ 1GHz	AR	150W1000M3	310037	N.C.R.
Amplifier Freq. Range :0.8MHz ~ 3GHz	AR	60S1G3M3	310102	N.C.R.
Digital SIGNAL GENERATOR	HP	ESG-D3000A	US36260655	DEC. 27, 2012
RF Power Meter	BOONTON	4232A-01-02	122202	DEC. 28, 2012
Log – Periodic Antenna	AR	AT5080	309817	N.C.R.
RF Communications test set	HP	8920A	3412A04298	DEC. 28, 2012
Test S/W	RS SW1005 R1_4			

Fast Transients/Burst Test Site (IEC/EN 61000-4-4)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Computer	IBM	M/T 8183 - ICV	99BG137	N.C.R.
VGA Monitor	Acer	1555	91716023058420 0572P5C431	N.C.R.
Keyboard	HP	KB - 0133	B69360MGAPEO K5	N.C.R.
EMC Pro IMMUNITY TEST SYSTEM	KeyTek	EMCpro	0312231	JAN. 13, 2013
Test S/W	CE Ware 3.00b			

Surge Immunity Test Site (IEC/EN EN 61000-4-5)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Computer	IBM	M/T 8183 - ICV	99BG137	N.C.R.
VGA Monitor	Acer	1555	91716023058420 0572P5C431	N.C.R.
Keyboard	HP	KB - 0133	B69360MGAPEO K5	N.C.R.
EMC Pro IMMUNITY TEST SYSTEM	KeyTek	EMCpro	0312231	JAN. 13, 2013
Test S/W	CE Ware 3.00b			

CS Test Site (IEC/EN 61000-4-6)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Computer	HP	d330 uT	SGH3480LTH	N.C.R.
VGA Monitor	NEC	JC-1572VMA	6600645RA	N.C.R.
Keyboard	IBM	KB - 8923	1021424	N.C.R.
CS Frankonia EMVMess-System Gmbh	FRANKONIA	CIT-10/75	102C3220	APR. 11, 2012
FCC Coupling Decoupling Network Freq. range : 150KHz~230MHz	FRANKONIA	CDN M2+M3	A3011095	APR. 10, 2012
FCC EM Injection Clamp	----------	F-203I-23mm	449	NOV, 17, 2012
Test S/W	CS-EN61000-4-6			

Voltage Dips/Short Interruption and Voltage Variation Immunity Test Site (IEC/EN 61000-4-11)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Computer	IBM	M/T 8183 - ICV	99BG137	N.C.R.
VGA Monitor	Acer	1555	91716023058420 0572P5C431	N.C.R.
Keyboard	HP	KB - 0133	B69360MGAPEO K5	N.C.R.
EMC Pro IMMUNITY TEST SYSTEM	KeyTek	EMCpro	0312231	JAN. 13, 2013
Test S/W	CE Ware 3.00b			

3.4 DECISION OF FINAL TEST MODE

1. The following test mode was scanned during the preliminary test:

Radiation Modes(Below 1GHz)

1.	Normal operation

Radiation Modes(Above 1GHz)

1.	Normal operation

Conduction (Power port) Modes

1.	Normal operation

Conduction (Telecom port) Modes

1.	N/A

Immunity Modes

1.	Normal operation

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Radiation Modes(Below 1GHz): Mode 1
Radiation Modes(Above 1GHz): Mode 1
Conduction (Power port) Modes: Mode 1
Conduction (Telecom port) Modes: Mode 1
Immunity Modes: Mode 1

Then, the EUT configuration and cable configuration of the above highest emission mode was chosen for all final test items.

4. INSTRUMENT AND CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at CCS Tainan Lab.

No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW-1037).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF

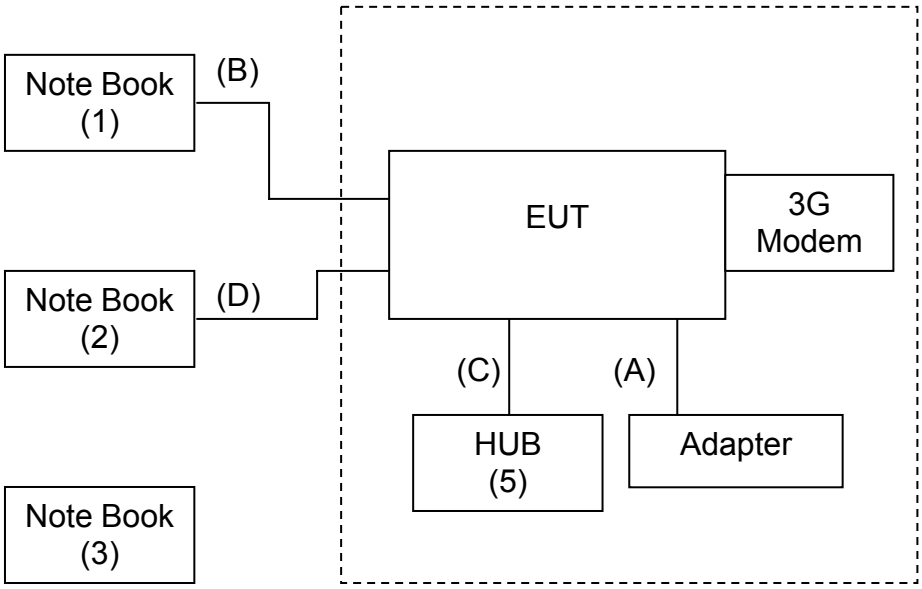
The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Germany	TUV NORD
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT



6.2 SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	Note Book	IBM	R51	R33026	Power cable, unshd, 1.6m
2	Note Book	IBM	T43	DoC	Power cable, unshd, 1.6m
3	Note Book	IBM	R50E	DoC	Power cable, unshd, 1.6m
4	3G Modem	NOVATEL	Qualcomm 3G CDMA	PKRNVWMC727	N/A
5	HUB	BARRICAD	SMC7008BR	DoC	Power cable, unshd, 1.6m

No.	Signal cable description	
A	DC Power	Unshielded, 1.8m, 1pcs
B	LAN	Unshielded, 10m, 1pcs
C	LAN	Unshielded, 2.0m, 3pcs
D	LAN	Unshielded, 10m, 1pcs

REMARK:
1. All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

6.3 TEST SETUP

The equipment under test was configured and operated in a manner to communicate with WLAN continuously. EUT tends to maximize its emission characteristics in a typical application for conducted and radiated emission measurement. The RF module plus ancillary (stand alone unit) was evaluated as per table 2 of clause 7.1 of ETSI Final draft ETSI EN 301 489-1 $_{V1.8.1: 2008}$. The transmitter was active during the conducted and radiated emission measurements.

Software Used During the Test	
Operating System	Windows XP
Program Sequence	Run ping.exe and link the auxiliary AP.
RF Management Software	S/W provided applicant.

REMARK: During the test, no modification is made to the EUT to comply with Class B limit levels.

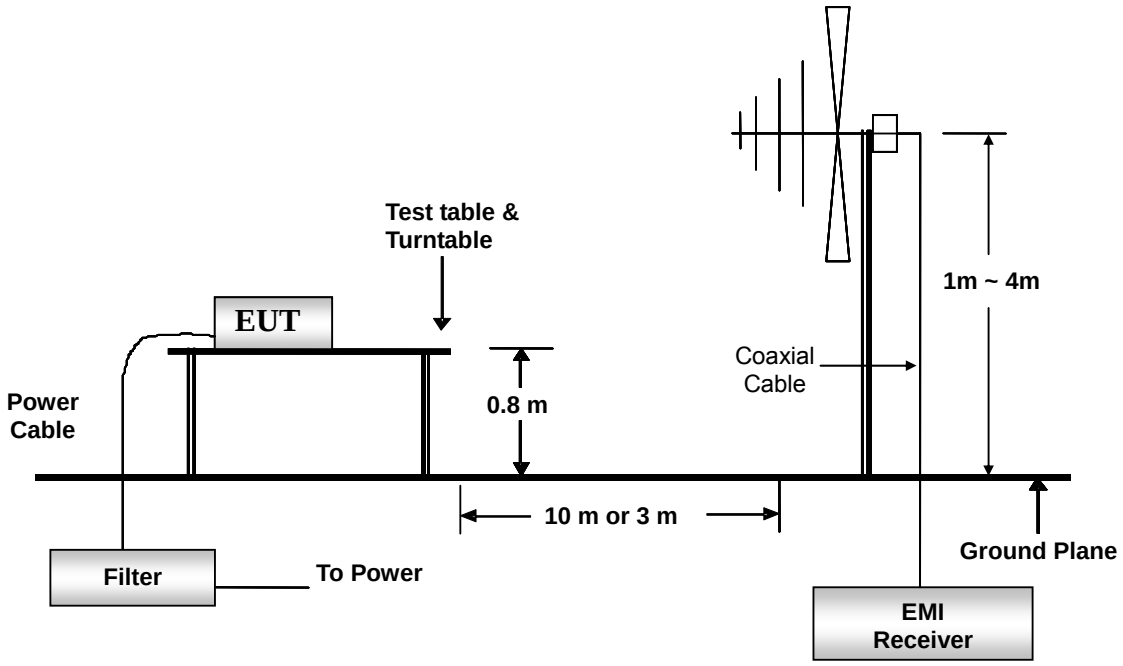
7. ETSI EN 301 489-1/-17 REQUIREMENTS

7.1 RADIATED EMISSION

LIMIT

Please refer to ETSI EN 301 489-1 Clause 8.2.3, Table 4 and EN 55022 Clause 6, Table 6, Class B

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.2.3 and EN 55022 Clause 6 for the measurement methods.

TEST RESULTS

No non-compliance noted.

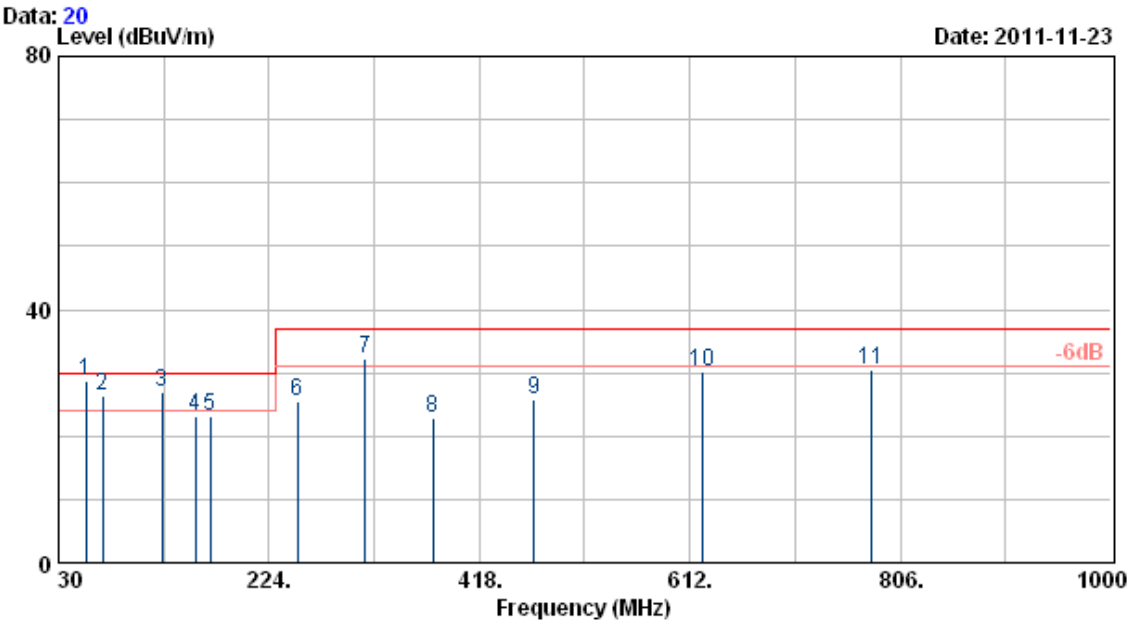
To power source

TEST DATA

Below 1GHz

Model No.	BR485d	Test Mode	Normal operation
Environmental Conditions	27 ℃, 51 % RH	Resolution Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function:	Quasi-peak.	Tested By	Taiyu Cyu

(The chart below shows the highest readings taken from the final data.)



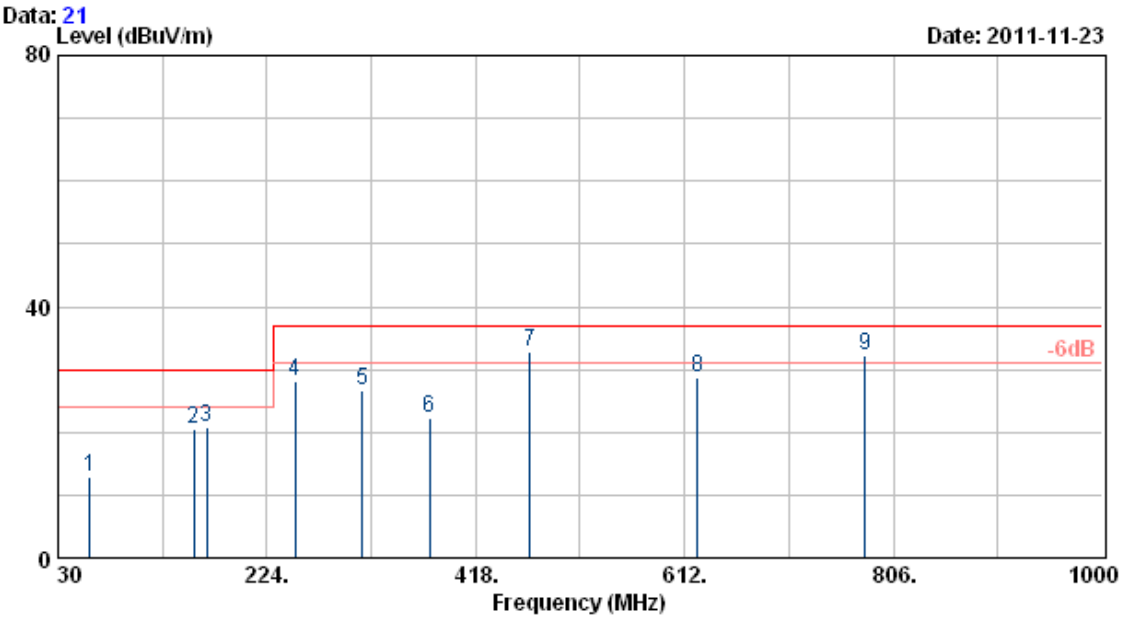
Freq. MHz	Reading Level dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
55.28	19.21	7.76	1.65	28.62	30.00	-1.39	QP
70.85	16.54	7.94	1.91	26.39	30.00	-3.61	QP
125.00	10.48	13.86	2.68	27.01	30.00	-2.99	QP
156.00	7.70	12.31	3.14	23.16	30.00	-6.84	QP
169.95	8.24	11.72	3.30	23.26	30.00	-6.74	QP
250.00	9.20	12.20	4.00	25.40	37.00	-11.60	QP
312.50	13.70	13.80	4.60	32.10	37.00	-4.90	QP
375.00	2.74	15.00	5.11	22.85	37.00	-14.15	QP
468.00	2.60	17.48	5.85	25.93	37.00	-11.07	QP
623.98	4.20	19.16	6.96	30.32	37.00	-6.68	QP
780.00	1.20	21.08	8.06	30.34	37.00	-6.66	QP

Note:

1. QP= Quasi-peak Reading.
2. The other emission levels were very low against the limit.

Model No.	BR485d	Test Mode	Normal operation
Environmental Conditions	27 ℃, 51 % RH	Resolution Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested By	Taiyu Cyu

(The chart below shows the highest readings taken from the final data.)



Freq. MHz	Reading Level dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
59.25	3.79	7.42	1.69	12.90	30.00	-17.11	QP
156.00	5.20	12.31	3.14	20.66	30.00	-9.34	QP
168.35	5.70	11.76	3.29	20.75	30.00	-9.25	QP
250.00	12.08	12.20	4.00	28.28	37.00	-8.72	QP
312.50	8.16	13.80	4.60	26.56	37.00	-10.44	QP
375.00	2.10	15.00	5.11	22.21	37.00	-14.79	QP
468.00	9.61	17.48	5.85	32.94	37.00	-4.06	QP
623.98	2.71	19.16	6.96	28.83	37.00	-8.17	QP
780.00	3.20	21.08	8.06	32.34	37.00	-4.66	QP

Note:

1. QP= Quasi-peak Reading.
2. The other emission levels were very low against the limit.

Above 1GHz

Model No.	BR485d	**Test Mode**	Normal Operation
Environmental Conditions	23deg.C, 60% RH	**6dB Bandwidth**	120 kHz
Antenna Pole	Vertical / Horizontal	**Antenna Distance**	3m
Highest frequency generated or used	work clock frequency	**Upper frequency**	See Note
Detector Function	Peak & Average	**Tested by**	Agun Huang

(The chart below shows the highest readings taken from the final data.) 2011/12/14 OATS 6

	Normal Operation				Measurement Distance at 3m				Horizontal polarity		
	Freq.	Reading	AF	Closs	Pre-amp	Filter	Level	Limit	Margin	Mark	Height
	(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
*	1016.03	56.64	24.57	2.03	41.80	0.69	42.14	70.00	-27.86	P	1.00
*	1016.03	42.19	24.57	2.03	41.80	0.69	27.69	50.00	-22.31	A	1.00
	1658.54	55.97	27.80	2.25	41.50	0.87	45.40	70.00	-24.60	P	1.00
	1658.54	48.02	27.80	2.25	41.50	0.87	37.45	50.00	-12.55	A	1.00
*	4824.23	53.48	33.17	3.73	42.38	0.69	48.69	74.00	-25.31	P	1.00
*	4824.23	49.42	33.17	3.73	42.38	0.69	44.63	54.00	-9.37	A	1.00
	6431.99	50.29	35.09	4.32	42.78	0.77	47.69	74.00	-26.31	P	1.00
	6431.99	46.84	35.09	4.32	42.78	0.77	44.24	54.00	-9.76	A	1.00

	Normal Operation				Measurement Distance at 3m				Vertical polarity		
	Freq.	Reading	AF	Closs	Pre-amp	Filter	Level	Limit	Margin	Mark	Height
	(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
*	1016.03	57.10	24.57	2.03	41.80	0.69	42.60	70.00	-27.40	P	1.00
*	1016.03	43.85	24.57	2.03	41.80	0.69	29.34	50.00	-20.66	A	1.00
	1658.54	54.68	27.80	2.25	41.50	0.87	44.11	70.00	-25.89	P	1.00
	1658.54	48.57	27.80	2.25	41.50	0.87	38.00	50.00	-12.00	A	1.00
*	4824.10	56.80	33.17	3.73	42.38	0.69	52.01	74.00	-21.99	P	1.00
*	4824.10	52.50	33.17	3.73	42.38	0.69	47.71	54.00	-6.29	A	1.00
	6432.03	51.66	35.09	4.32	42.78	0.77	49.06	74.00	-24.94	P	1.00
	6432.03	47.82	35.09	4.32	42.78	0.77	45.22	54.00	-8.78	A	1.00

Note: 1. No applicable, when the highest frequency of the internal sources of the EUT is less than 108MHz, the measurement shall only be made up to 1 GHz.

2. P= Peak Reading; A= Average Reading.

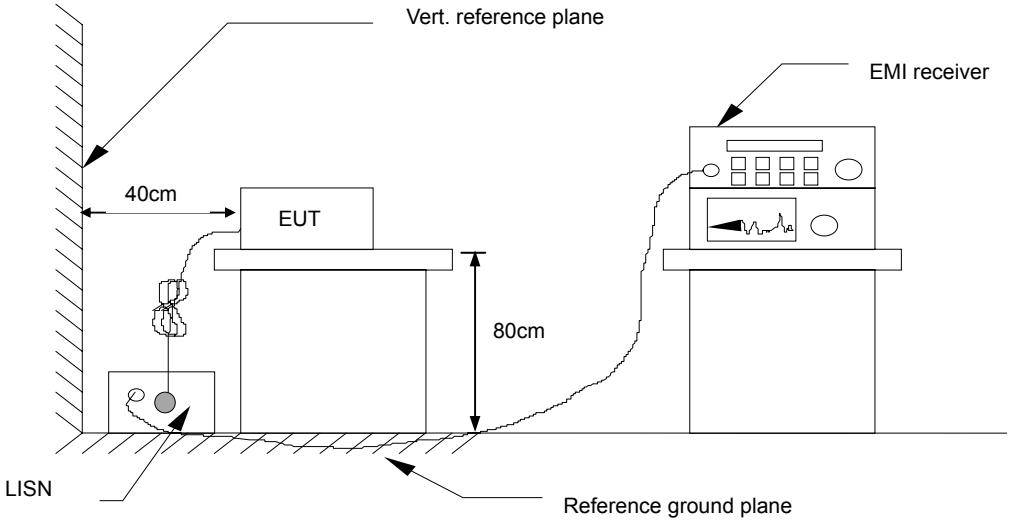
3. The other emission levels were very low against the limit.

7.2 AC MAINS LINE CONDUCTED EMISSION

LIMIT

Please refer to ETSI EN 301 489-1 Clause 8.4.3, Table 8 and EN 55022 Clause 5, Table 2, Class B.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.4.3 and EN 55022 Clause 5 for the measurement methods.

TEST RESULTS

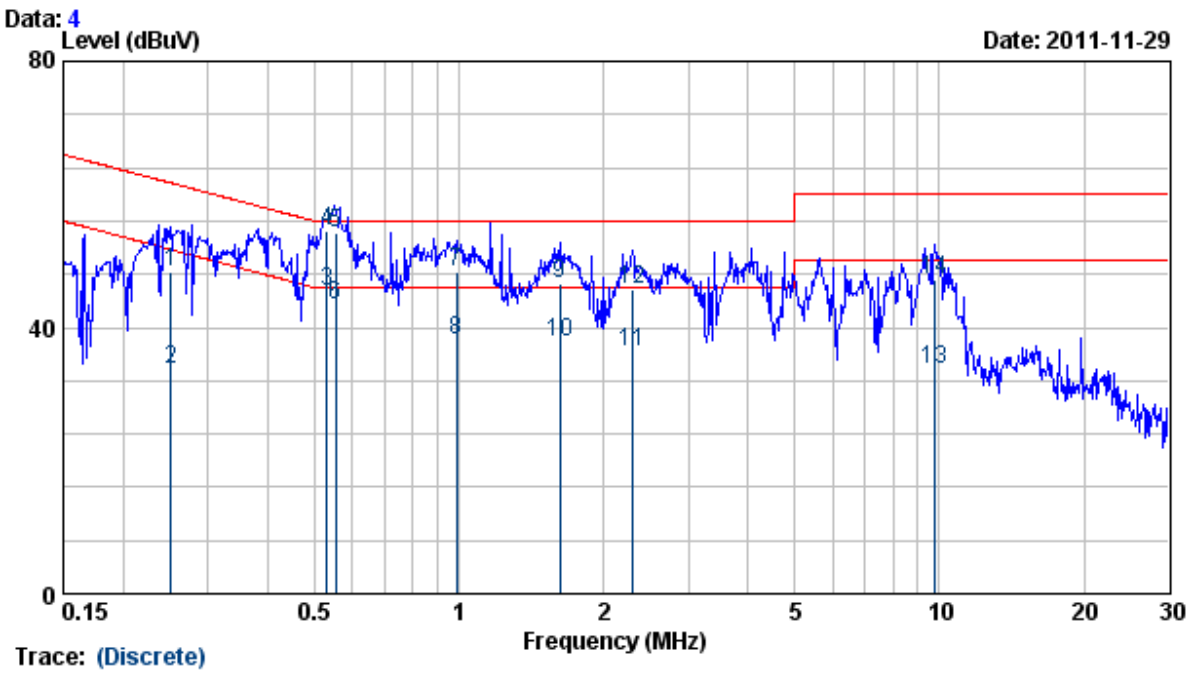
No non-compliance noted.

TEST DATA

Model No.	BR485d	**Resolution Bandwidth**	9 kHz
Environmental Conditions	24.8 ℃, 53 %	**Test Mode**	Normal operation
Tested by	Ted Huang		

Line

(The chart below shows the highest readings taken from the final data.)



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.25	9.95	0.22	38.28	48.45	61.71	-13.27	QP
0.25	9.95	0.22	23.53	33.70	51.71	-18.02	AVERAGE
0.53	10.01	0.23	35.11	45.35	46.00	-0.65	AVERAGE
0.53	10.01	0.23	44.12	54.36	56.00	-1.64	QP
0.55	10.02	0.23	44.04	54.28	56.00	-1.72	QP
0.55	10.02	0.23	33.17	43.41	46.00	-2.59	AVERAGE
0.99	10.05	0.20	38.12	48.37	56.00	-7.63	QP
0.99	10.05	0.20	27.91	38.16	46.00	-7.84	AVERAGE
1.62	10.05	0.22	36.34	46.61	56.00	-9.39	QP
1.62	10.05	0.22	27.58	37.85	46.00	-8.15	AVERAGE
2.30	10.02	0.24	26.10	36.36	46.00	-9.64	AVERAGE
2.30	10.02	0.24	35.54	45.80	56.00	-10.20	QP
9.81	10.07	0.31	23.22	33.60	50.00	-16.40	AVERAGE
9.81	10.07	0.31	36.70	47.08	60.00	-12.92	QP

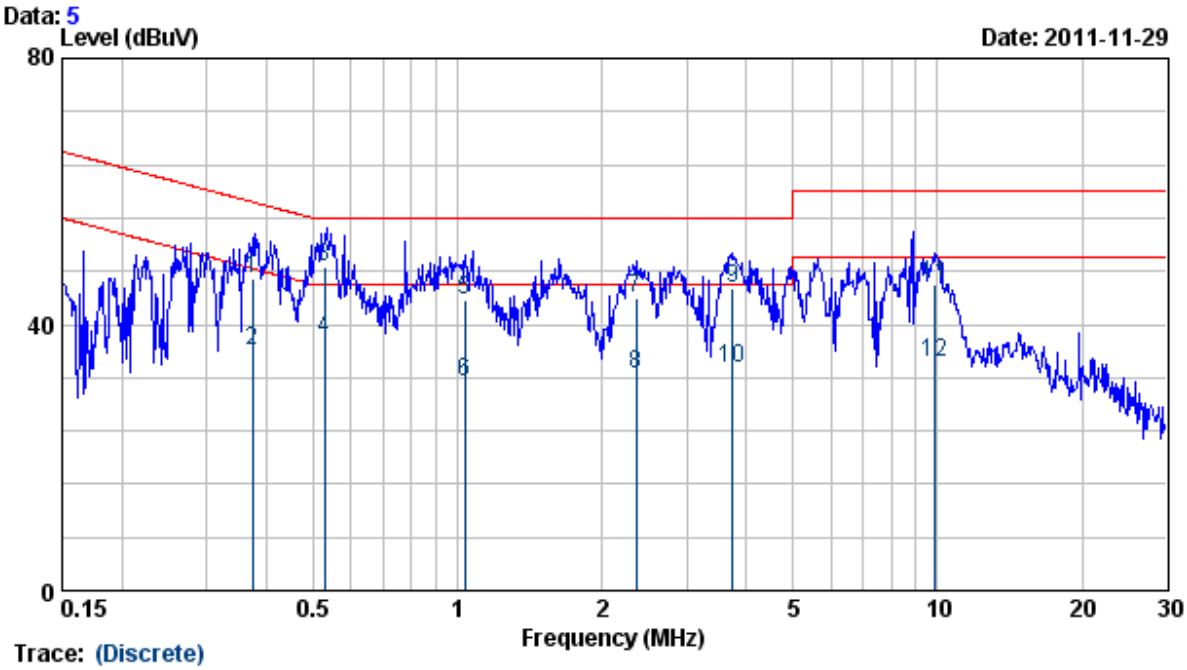
NOTE:

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB)+ Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

Model No.	BR485d	**Resolution Bandwidth**	9 kHz
Environmental Conditions	24.8 ℃, 53 %	**Test Mode**	Normal operation
Tested by:	Ted Huang		

Neutral

(The chart below shows the highest readings taken from the final data.)



Trace: (Discrete)

Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.37	9.98	0.22	36.72	46.92	58.40	-11.48	QP
0.37	9.98	0.22	25.82	36.02	48.40	-12.38	AVERAGE
0.53	10.01	0.23	38.42	48.66	56.00	-7.34	QP
0.53	10.01	0.23	27.58	37.82	46.00	-8.18	AVERAGE
1.04	10.05	0.20	33.34	43.59	56.00	-12.41	QP
1.04	10.05	0.20	21.03	31.28	46.00	-14.72	AVERAGE
2.36	10.02	0.24	33.62	43.88	56.00	-12.12	QP
2.36	10.02	0.24	22.24	32.50	46.00	-13.50	AVERAGE
3.74	10.03	0.27	35.10	45.40	56.00	-10.60	QP
3.74	10.03	0.27	23.15	33.45	46.00	-12.55	AVERAGE
9.91	10.07	0.31	35.66	46.04	60.00	-13.96	QP
9.91	10.07	0.31	24.04	34.42	50.00	-15.58	AVERAGE

NOTE:

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB)+ Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

7.3 CONDUCTED EMISSION MEASUREMENT AT TELECOMMUNICATION PORTS

LIMITS

The telecommunication ports shall meet the class B limits given in EN 55022 [1].

Frequency (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	84 ~ 74	74 ~ 64	40 ~ 30	30 ~ 20
0.5 - 30.0	74	64	30	20

Note: The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz.

Alternatively, for equipment intended to be used in telecommunication centres only, the class A limits given in EN 55022 [1] may be used.

Frequency (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	97 ~ 87	84 ~ 74	53 ~ 43	40 ~ 30
0.5 ~ 30.0	87	74	43	30

NOTE: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

TEST PROCEDURE

Selecting ISN for unscreened cable or a current probe for screened cable to take measurement.
The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.
Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.
Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
In case of measuring on the screened cable, the current limit shall be applied; otherwise the voltage limit should be applied.

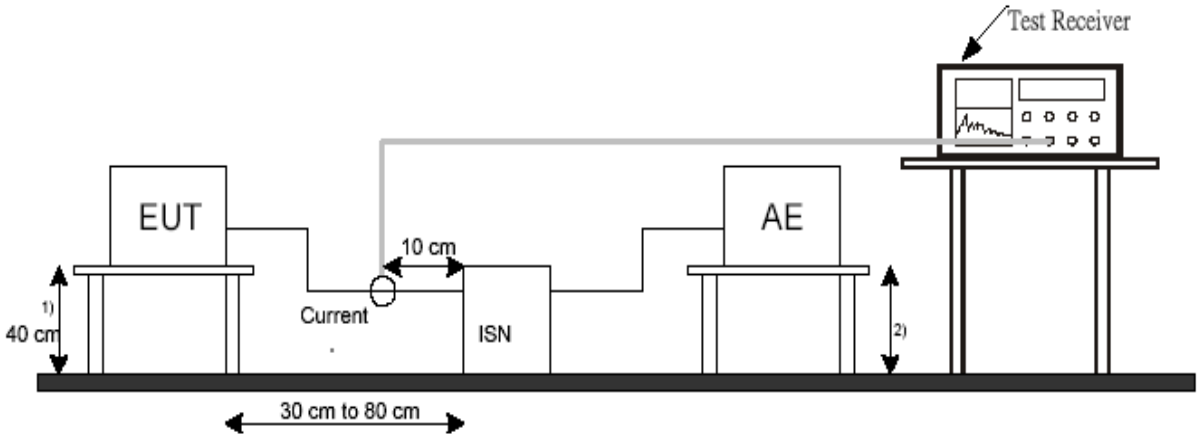
The following test mode was scanned during the preliminary test:
Mode:

1. LAN 10Mbps
2 LAN 100Mbps
3 WAN 10Mbps
4 WAN 100Mbps

After the preliminary scan, we found the following test mode(s) producing the highest emission level and test data of the worst case was recorded.

Mode 1; 2; 3; 4

TEST SETUP



1) Distance to the ground reference plane (vertical or horizontal).

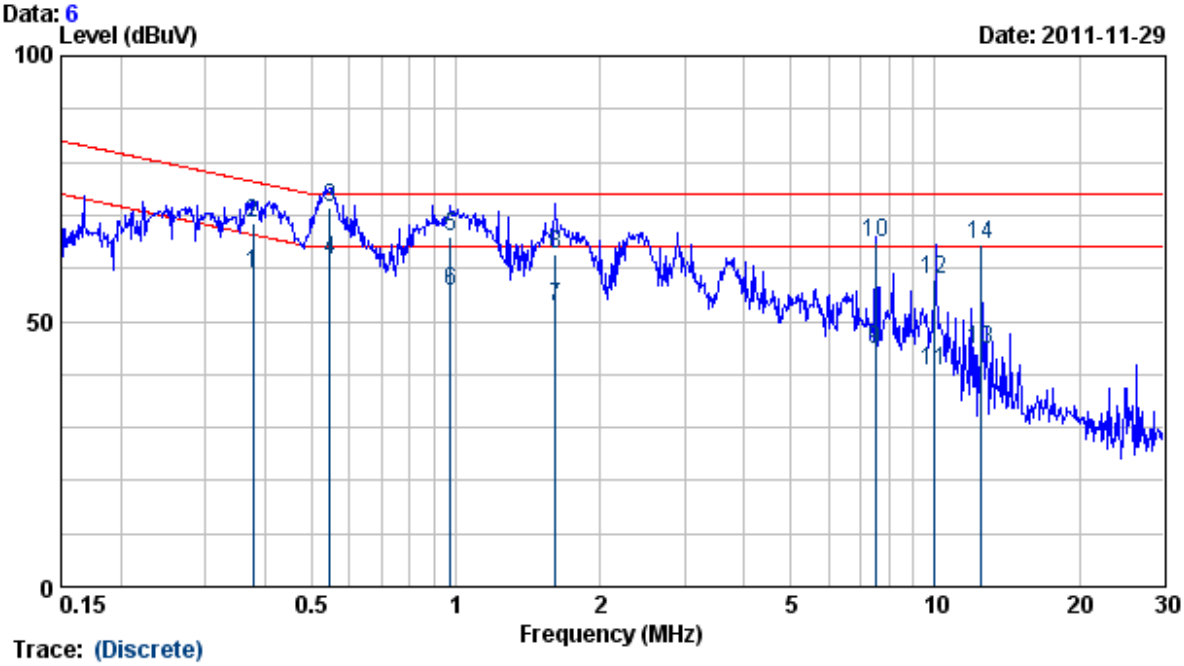
2) Distance to the ground reference plane is not critical.

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

TEST RESULTS

Common Mode Conducted Emission (LAN Port)

Model No.	BR485d	Resolution Bandwidth	9 kHz
Environmental Conditions	24.8 ℃, 63 %	Test Mode	Mode 1
Tested by:	Ted Huang		



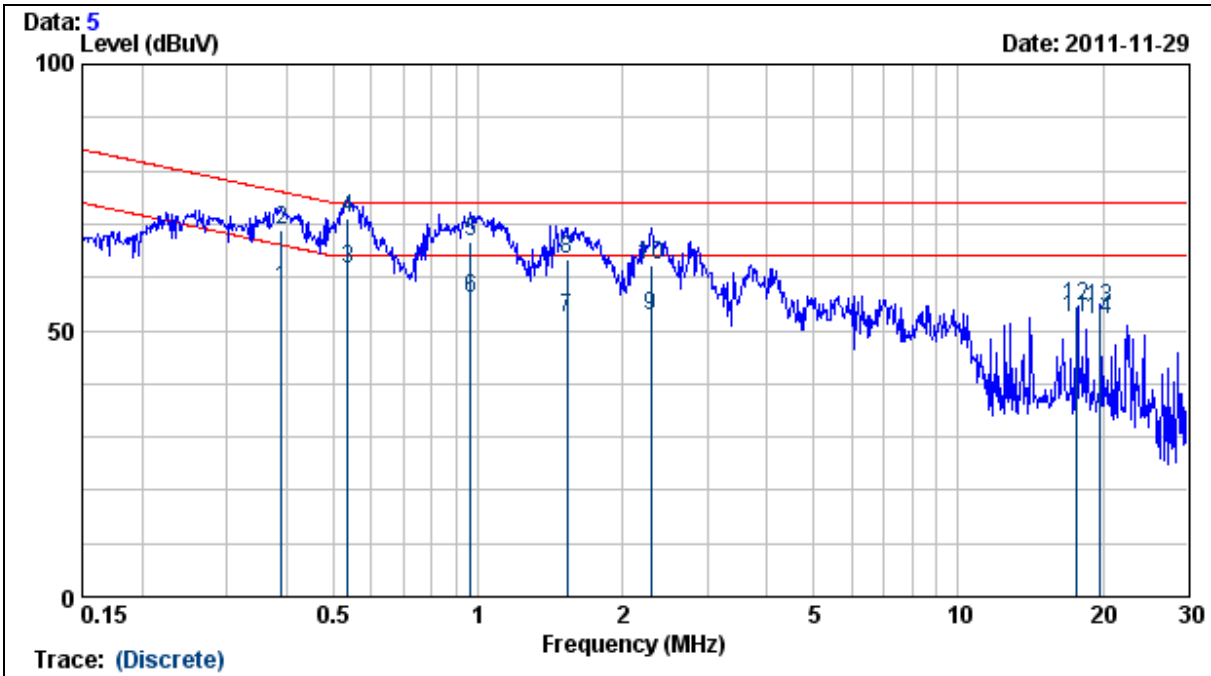
Trace: (Discrete)

Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.38	19.34	0.22	39.48	59.04	66.34	-7.31	AVERAGE
0.38	19.34	0.22	48.86	68.42	76.34	-7.93	QP
0.54	19.31	0.23	51.72	71.26	74.00	-2.74	QP
0.54	19.31	0.23	41.88	61.42	64.00	-2.58	AVERAGE
0.97	19.30	0.20	46.60	66.10	74.00	-7.90	QP
0.97	19.30	0.20	36.15	55.65	64.00	-8.35	AVERAGE
1.61	19.23	0.22	33.46	52.91	64.00	-11.09	AVERAGE
1.61	19.23	0.22	43.32	62.77	74.00	-11.23	QP
7.50	19.17	0.28	25.22	44.67	64.00	-19.33	AVERAGE
7.50	19.17	0.28	45.30	64.75	74.00	-9.25	QP
10.00	19.20	0.31	21.33	40.84	64.00	-23.16	AVERAGE
10.00	19.20	0.31	38.52	58.03	74.00	-15.97	QP
12.50	19.22	0.28	25.10	44.59	64.00	-19.41	AVERAGE
12.50	19.22	0.28	44.84	64.33	74.00	-9.67	QP

REMARKS :

1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)
2. Over Limit value (dB) = Level (dBuV) – Limit Line (dBuV)

Model No.	BR485d	Resolution Bandwidth	9 kHz
Environmental Conditions	24.8 ℃, 63 %	Test Mode	Mode 2
Tested by:	Ted Huang		

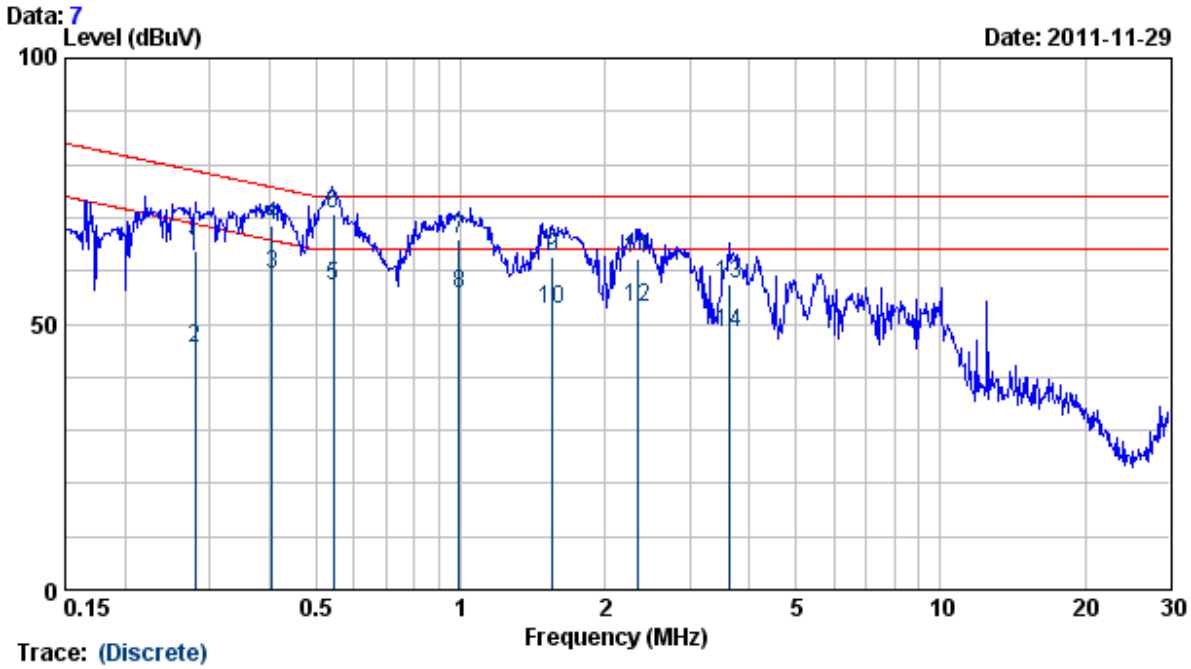


Trace: (Discrete)

Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.39	19.33	0.22	38.42	57.97	66.08	-8.11	AVERAGE
0.39	19.33	0.22	49.28	68.83	76.08	-7.25	QP
0.53	19.31	0.23	41.96	61.50	64.00	-2.50	AVERAGE
0.53	19.31	0.23	51.42	70.96	74.00	-3.04	QP
0.96	19.30	0.20	47.22	66.72	74.00	-7.28	QP
0.96	19.30	0.20	36.63	56.13	64.00	-7.87	AVERAGE
1.53	19.24	0.22	32.97	52.43	64.00	-11.57	AVERAGE
1.53	19.24	0.22	43.84	63.30	74.00	-10.70	QP
2.29	19.19	0.24	33.46	52.89	64.00	-11.11	AVERAGE
2.29	19.19	0.24	43.00	62.43	74.00	-11.57	QP
17.69	19.21	0.23	32.82	52.26	64.00	-11.74	AVERAGE
17.69	19.21	0.23	35.30	54.74	74.00	-19.26	QP
19.71	19.20	0.21	34.70	54.11	74.00	-19.89	QP
19.71	19.20	0.21	32.45	51.86	64.00	-12.14	AVERAGE

REMARKS : 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)
2. Over Limit value (dB) = Level (dBuV) – Limit Line (dBuV)

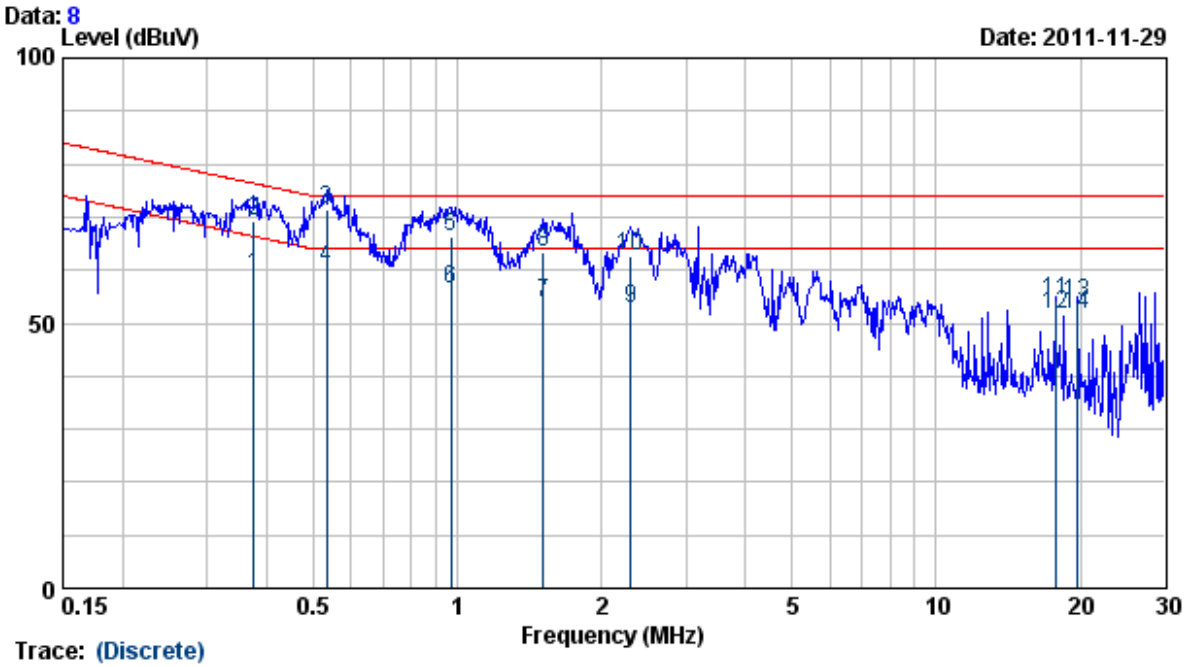
Model No.	BR485d	Resolution Bandwidth	9 kHz
Environmental Conditions	24.8 ℃, 63 %	Test Mode	Mode 3
Tested by:	Ted Huang		



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.28	19.37	0.22	44.32	63.90	78.81	-14.91	QP
0.28	19.37	0.22	25.88	45.46	68.81	-23.35	AVERAGE
0.41	19.33	0.22	39.86	59.41	65.73	-6.32	AVERAGE
0.41	19.33	0.22	49.00	68.55	75.73	-7.18	QP
0.54	19.31	0.23	37.57	57.11	64.00	-6.89	AVERAGE
0.54	19.31	0.23	51.06	70.60	74.00	-3.40	QP
0.99	19.30	0.20	46.58	66.08	74.00	-7.92	QP
0.99	19.30	0.20	36.29	55.79	64.00	-8.21	AVERAGE
1.55	19.24	0.22	43.24	62.70	74.00	-11.30	QP
1.55	19.24	0.22	33.41	52.87	64.00	-11.13	AVERAGE
2.35	19.19	0.24	42.98	62.41	74.00	-11.59	QP
2.35	19.19	0.24	33.60	53.03	64.00	-10.97	AVERAGE
3.63	19.16	0.26	38.16	57.58	74.00	-16.42	QP
3.63	19.16	0.26	28.77	48.19	64.00	-15.81	AVERAGE

REMARKS : 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)
2. Over Limit value (dB) = Level (dBuV) – Limit Line (dBuV)

Model No.	BR485d	Resolution Bandwidth	9 kHz
Environmental Conditions	24.8 ℃, 63 %	Test Mode	Mode 4
Tested by:	Ted Huang		



Trace: (Discrete)

Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.38	19.34	0.22	39.39	58.95	66.39	-7.44	AVERAGE
0.38	19.34	0.22	49.74	69.30	76.39	-7.09	QP
0.53	19.31	0.23	51.86	71.40	74.00	-2.60	QP
0.53	19.31	0.23	40.89	60.43	64.00	-3.57	AVERAGE
0.97	19.30	0.20	46.90	66.40	74.00	-7.60	QP
0.97	19.30	0.20	36.82	56.32	64.00	-7.68	AVERAGE
1.51	19.24	0.22	34.45	53.91	64.00	-10.09	AVERAGE
1.51	19.24	0.22	43.80	63.26	74.00	-10.74	QP
2.30	19.19	0.24	33.46	52.89	64.00	-11.11	AVERAGE
2.30	19.19	0.24	43.12	62.55	74.00	-11.45	QP
17.70	19.21	0.23	34.78	54.22	74.00	-19.78	QP
17.70	19.21	0.23	32.18	51.62	64.00	-12.38	AVERAGE
19.71	19.20	0.21	34.56	53.97	74.00	-20.03	QP
19.71	19.20	0.21	32.18	51.59	64.00	-12.41	AVERAGE

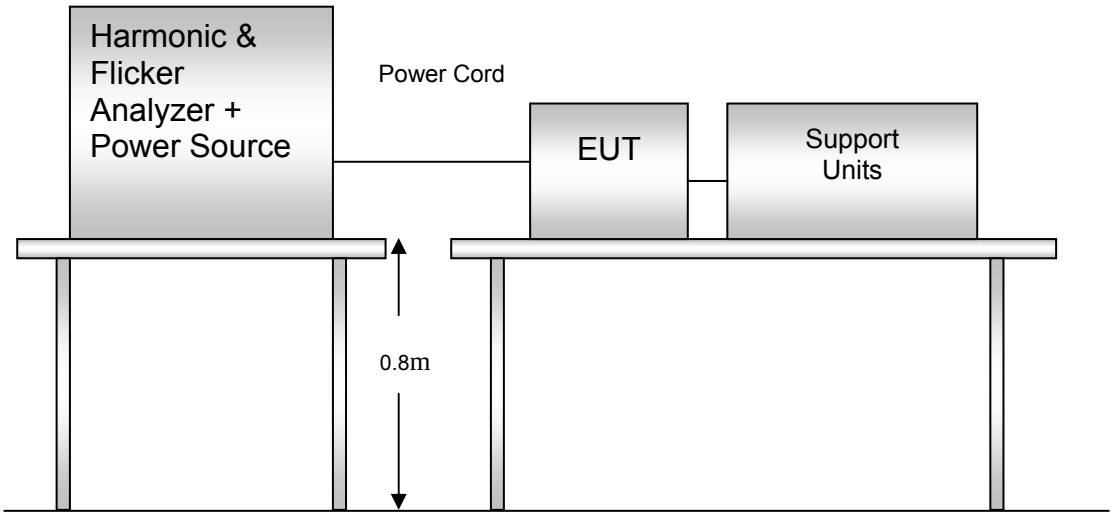
REMARKS : 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)
2. Over Limit value (dB) = Level (dBuV) – Limit Line (dBuV)

7.4 AC MAINS HARMONIC CURRENT EMISSION

LIMIT

Please refer to EN 61000-3-2.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to EN 61000-3-2 for the measurement methods.

Ambient Condition of the Test Site			
Power Consumption	N/A	**Test Results**	N/A
Environmental Conditions	N/A	**Limits**	Class ☒ A ☐ B ☐ C ☐ D
Test Mode	N/A	**Tested By**	N/A
Tested Date	N/A		

REMARK: According to clause 7 of EN 61000-3-2, equipment with a rated power of 75W or less, no limits apply. The test result is only for reference.

Test Result

※ Since the EUT is powered by DC source , this test item is not applicable.

7.5 AC MAINS VOLTAGE FLUCTUATION AND FLICKER

LIMIT

Please refer to EN 61000-3-3

TEST CONFIGURATION

(Same as the configuration of the AC MAINS HARMONIC CURRENT EMISSIONS TEST)

TEST PROCEDURE

Please refer to EN 61000-3-3 for the measurement methods.

Ambient Condition of the Test Site			
Temperature	26℃	**EUT AC Voltage Rating**	230 Vac, 50 Hz
Humidity	46%RH	**EUT DC Voltage Rating**	N/A
Tested by	Vision Chang	**Tested Date**	2011/11/30

Test Result

Supply Voltage : 230.0 to 230.1 Vrms 328.7 Vpk Frequency : 49.98 to 50.11 Hz
Load Current : 36.1 to 44.1 mArms 224 to 256 mApk Crest Factor: 6.133

Test Method: EN61000-3-3

Highest Level:	+0.12%	
Lowest Level:	-0.11%	
d(max):	0.23%	PASS
Highest d(t) of 500ms:	0.00%	PASS
Present d(t) over 3.33%:	0.00 Seconds	
Longest d(t) over 3.33%:	0.00 Seconds	
Highest Steady State:	+0.05%	
Lowest Steady State:	+0.05%	
Max d(c) Between Adjacent:	0.00%	PASS

Flicker Results :

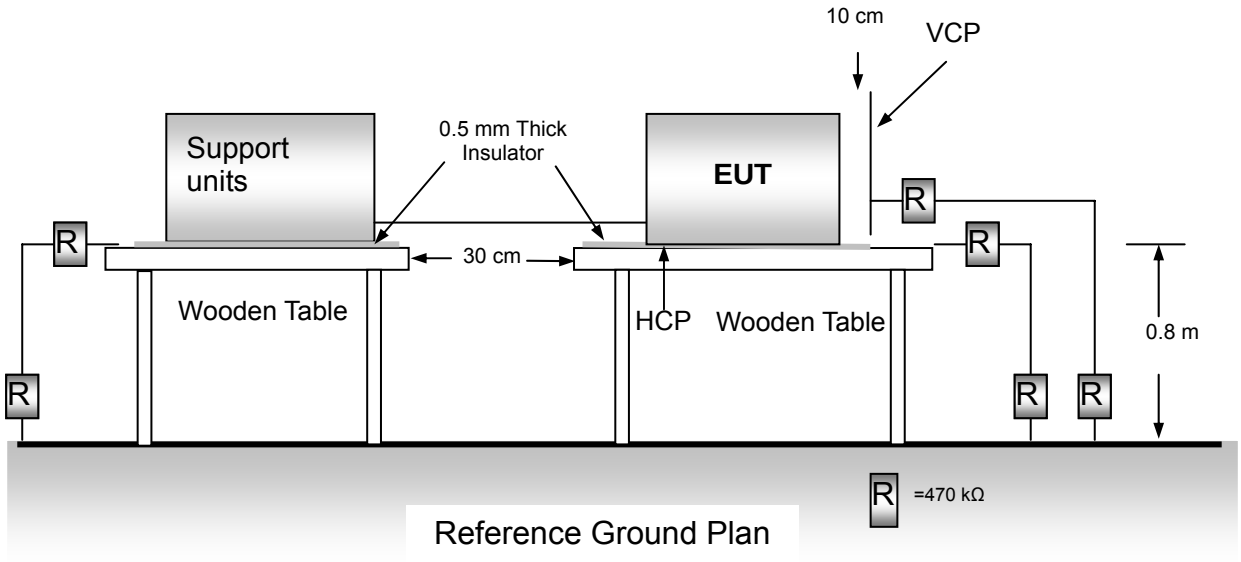
Pst Classifier Duration	Flicker	Plt Calculation Interval	Pst
0.1%	0.02	1:	0.06
0.7%	0.01	2:	0.06
1.0%	0.01	3:	0.06
1.5%	0.01	4:	0.06
2.2%	0.01	5:	0.06
3%	0.01	6:	0.06
4%	0.01	7:	0.06
6%	0.01	8:	0.06
8%	0.01	9:	0.07
10%	0.01	10:	0.07
13%	0.01	11:	0.06
17%	0.01	12:	0.07
30%	0.01		
50%	0.01		
80%	0.01	Plt =	0.00

7.6 ELECTROSTATIC DISCHARGE

LIMIT

Please refer to EN 61000-4-2

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

TEST RESULTS

Temperature	26 °C	Humidity	46 % RH
Pressure	1029 mbar	Tested By	Vision Chang
Required Passing Performance		Transient Phenomena	

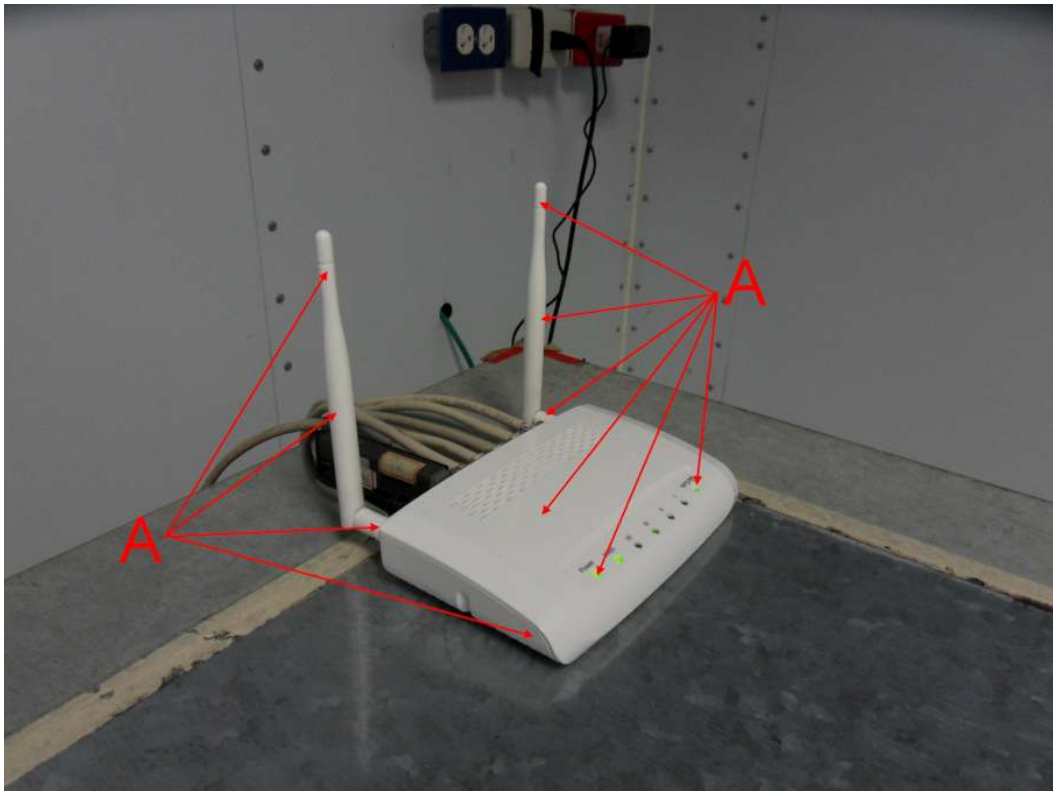
Air Discharge												
Test Points	Test Levels					Results						
	± 2 KV	± 4 KV	± 8 KV	± 12 KV	± 15 KV	Performance Criterion				Pass	Fail	
Front	☒	☒	☒	☐	☐	☒A	☐B	☐C	☐D	☒	☐	
Back	☒	☒	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐	
Left	☒	☒	☒	☐	☐	☒A	☐B	☐C	☐D	☒	☐	
Right	☒	☒	☒	☐	☐	☒A	☐B	☐C	☐D	☒	☐	
Top	☒	☒	☒	☐	☐	☒A	☐B	☐C	☐D	☒	☐	
Bottom	☐	☐	☐	☐	☐	☐A	☐B	☐C	☐D	☐	☐	

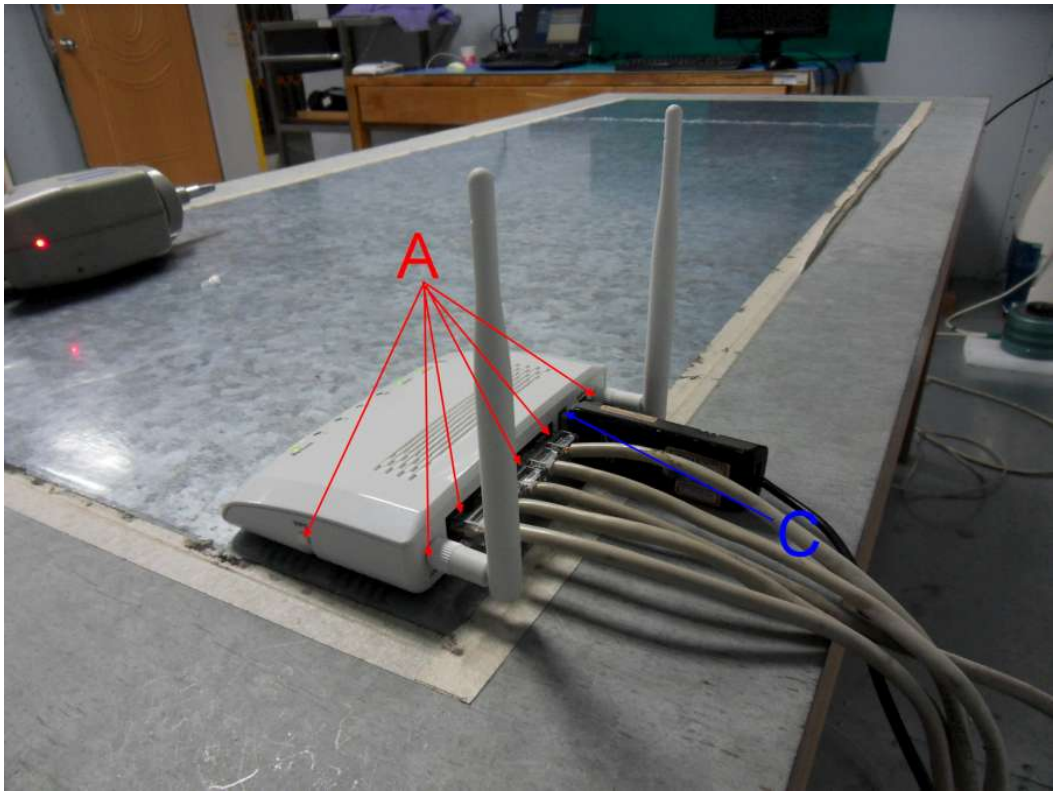
Contact Discharge											
Test Points	Test Levels					Results					
	± 2 KV	± 4 KV	± 6 KV	± 8 KV	± 12 KV	Performance Criterion				Pass	Fail
Front	☐	☐	☐	☐	☐	☐A	☐B	☐C	☐D	☐	☐
Back	☐	☒	☐	☐	☐	☐A	☒B	☐C	☐D	☐	☐
Left	☐	☐	☐	☐	☐	☐A	☐B	☐C	☐D	☐	☐
Right	☐	☐	☐	☐	☐	☐A	☐B	☐C	☐D	☐	☐
Top	☐	☐	☐	☐	☐	☐A	☐B	☐C	☐D	☐	☐
Bottom	☐	☐	☐	☐	☐	☐A	☐B	☐C	☐D	☐	☐

Discharge To Horizontal Coupling Plane										
SIDE OF EUT	Test Levels				Results					
	± 2 KV	± 4 KV	± 6 KV	± 8 KV	Performance Criterion				Pass	Fail
Front	☐	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐
Back	☐	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐
Left	☐	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐
Right	☐	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐

Discharge To Vertical Coupling Plane										
SIDE OF EUT	Test Levels				Results					
	± 2 KV	± 4 KV	± 6 KV	± 8 KV	Performance Criterion				Pass	Fail
Front	☐	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐
Back	☐	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐
Left	☐	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐
Right	☐	☒	☐	☐	☐A	☒B	☐C	☐D	☒	☐

The Photo for Discharge Points of EUT





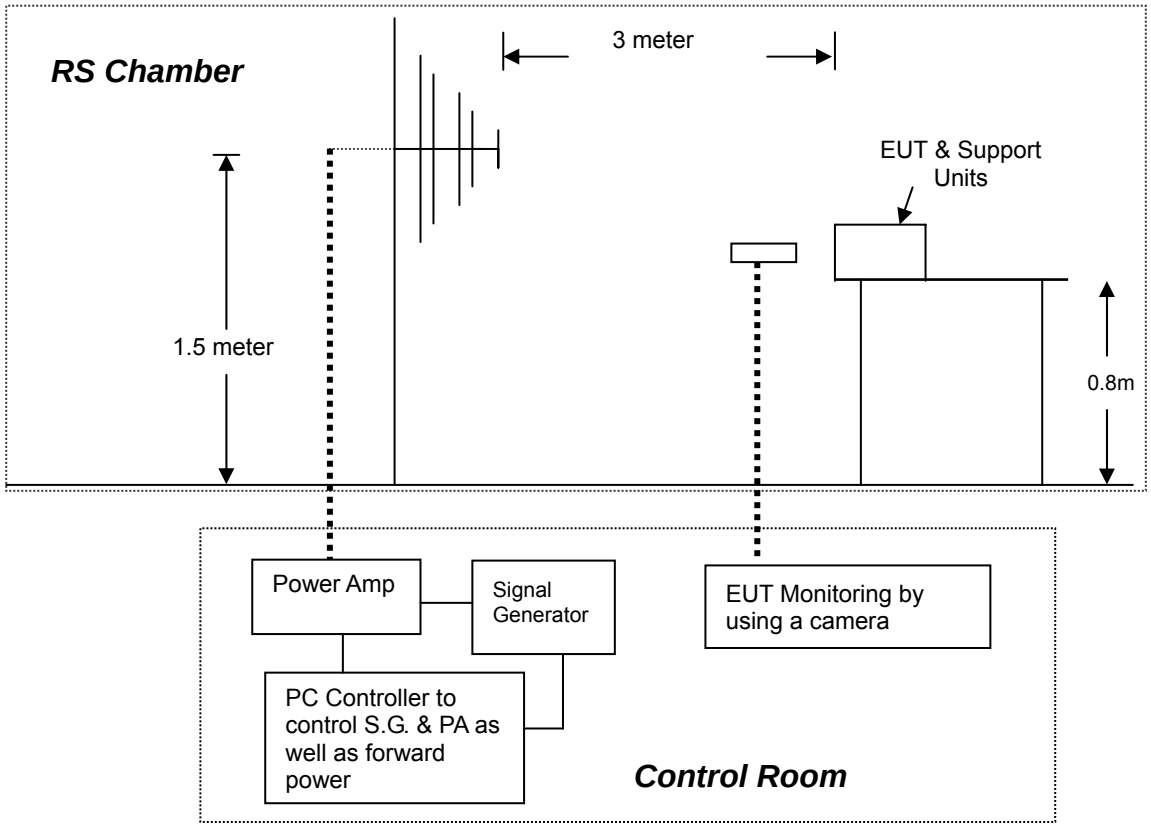
'A' Mark — Air Discharged ;
'C' Mark —Contact Discharged

7.7 RF ELECTROMAGNETIC FIELD

LIMIT

Please refer to EN 61000-4-3.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2 and EN 61000-4-3 for the measurement methods.

TEST RESULTS

Temperature	26 °C	**Humidity**	46 % RH
Pressure	1029 mbar	**Tested By**	Vision Chang
Dwell Time		2.86 sec.	
Required Passing Performance		Continuous Phenomena	

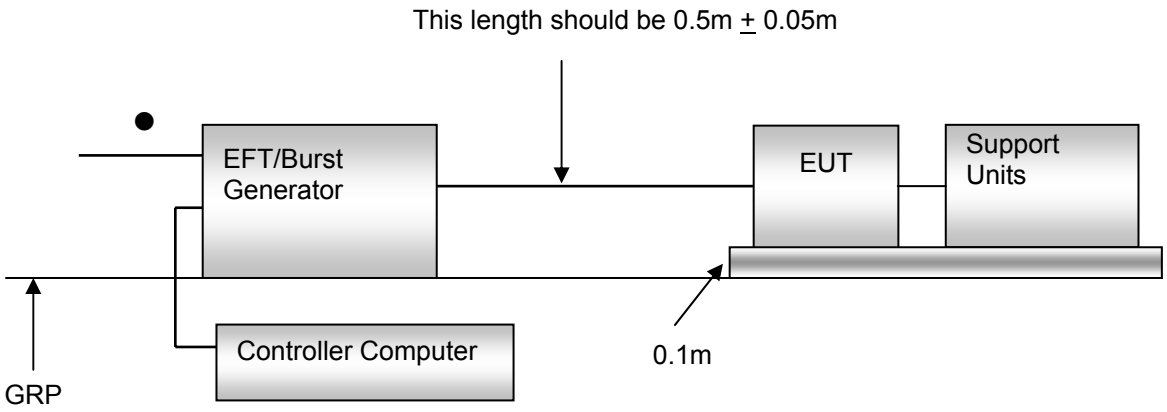
Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Criteria	Result
80 ~ 1000	V&H	0	3	☒ A ☐ B ☐ C ☐ D	PASS
80 ~ 1000	V&H	90	3	☒ A ☐ B ☐ C ☐ D	PASS
80 ~ 1000	V&H	180	3	☒ A ☐ B ☐ C ☐ D	PASS
80 ~ 1000	V&H	270	3	☒ A ☐ B ☐ C ☐ D	PASS
1400~2700	V&H	0	3	☒ A ☐ B ☐ C ☐ D	PASS
1400~2700	V&H	90	3	☒ A ☐ B ☐ C ☐ D	PASS
1400~2700	V&H	180	3	☒ A ☐ B ☐ C ☐ D	PASS
1400~2700	V&H	270	3	☒ A ☐ B ☐ C ☐ D	PASS

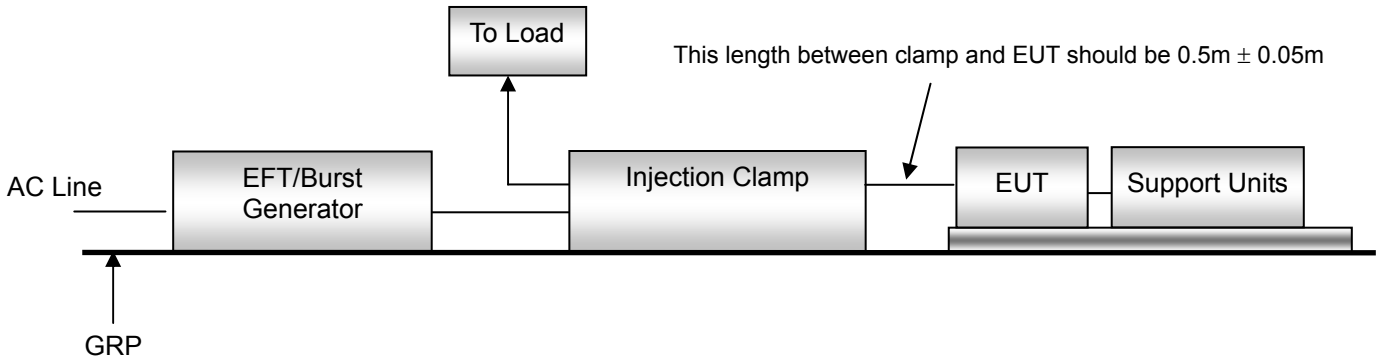
7.8 AC MAINS FAST TRANSIENTS – COMMON MODE

LIMIT

Please refer to EN 61000-4-4.

TEST CONFIGURATION





TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

TEST RESULTS

Temperature	26 °C	Humidity	46 % RH
Pressure	1029mbar	Tested By	Vision Chang
Required Passing Performance		Transient Phenomena	

POWER

Test Point	Polarity	Test Level (kV)	Criteria	Result
L	+/-	1kV	☒ A ☐ B ☐ C ☐ D	PASS
N	+/-	1kV	☒ A ☐ B ☐ C ☐ D	PASS
L+ N	+/-	1kV	☒ A ☐ B ☐ C ☐ D	PASS

SIGNAL

Test Point	Polarity	Test Level (kV)	Criteria	Result
RJ45	Clamp	0.5kV	☒ A ☐ B ☐ C ☐ D	PASS

Characteristics of the fast transient/burst generator

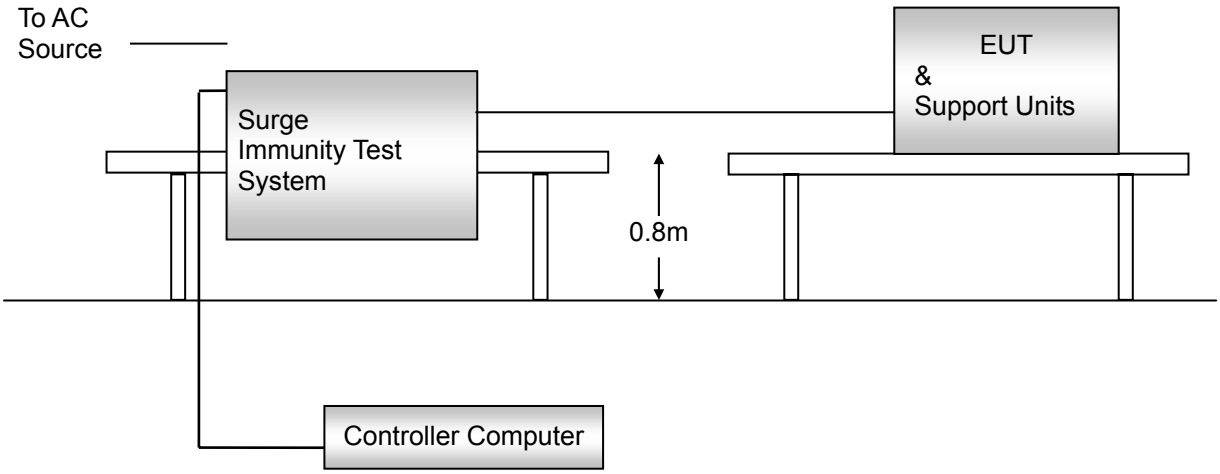
Burst duration	Burst Period	Repetition Rate	Rise time	Duration
15 ms $^{+}_{-}$20%	300 ms $^{+}_{-}$20%	5 kHz	5 ns $^{+}_{-}$30%	50 ns $^{+}_{-}$30%

7.9 AC MAINS SURGE

LIMIT

Please refer to EN 61000-4-5.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.8.2 and EN 61000-4-5 for the measurement methods.

TEST RESULTS

Temperature	26 °C	**Humidity**	46 % RH
Pressure	1029mbar	**Tested By**	Vision Chang
Required Passing Performance		Transient Phenomena	

Test Point	Polarity	Test Level (kV)	Criteria	Result
L –N	+/-	1kV	☒ A ☐ B ☐ C ☐ D	PASS

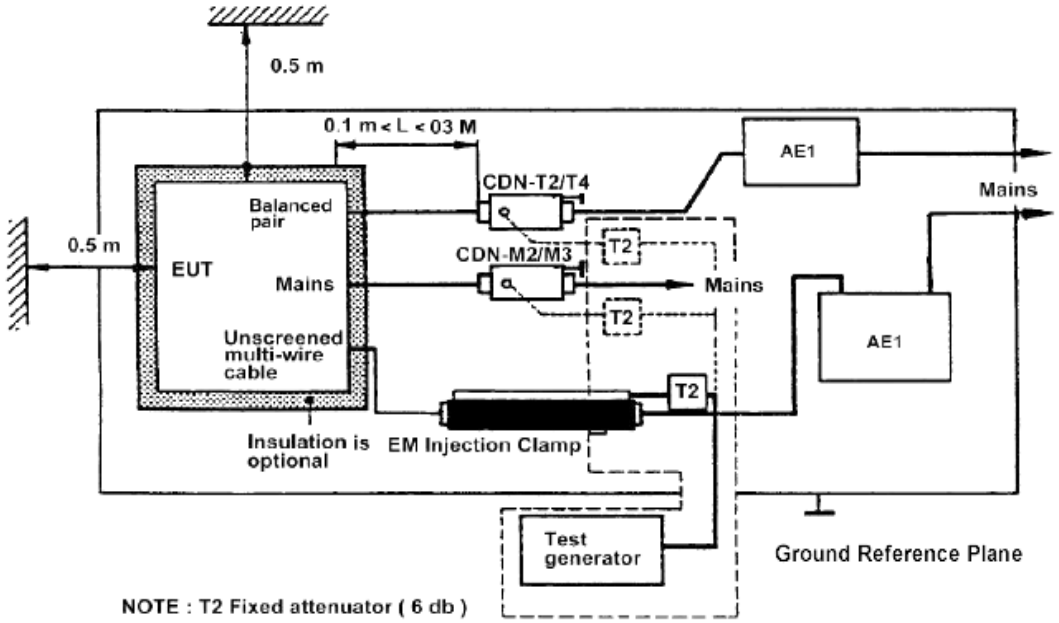
Phase shifting	Repetition Rate	Waveform parameter	Coupling Rate
0°、90°、180°、270°	30 sec	Combine Wave 1.2μs/50μs 8μs /20μs	5 times
		Impedance 2 Ω / 12 Ω	Each Angle and Polarity

7.10AC MAINS RF – COMMON MODE

LIMIT

Please refer to EN 61000-4-6.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2, ETSI EN 301 489-17 Clause 7.2.2 and EN 61000-4-6 for the measurement methods.

TEST RESULTS

Temperature	26 °C	**Humidity**	46% RH
Pressure	1028 mbar	**Tested By**	Vision Chang
Required Passing Performance		Continuous Phenomena	

POWER

Frequency Band (MHz)	Field Strength (Vrms)	Cable	Injection Method	Criteria	Result
0.15 ~ 80	3	AC Power	CDN-☒M2 ☐M3	☒ A ☐ B ☐ C ☐ D	PASS

SIGNAL

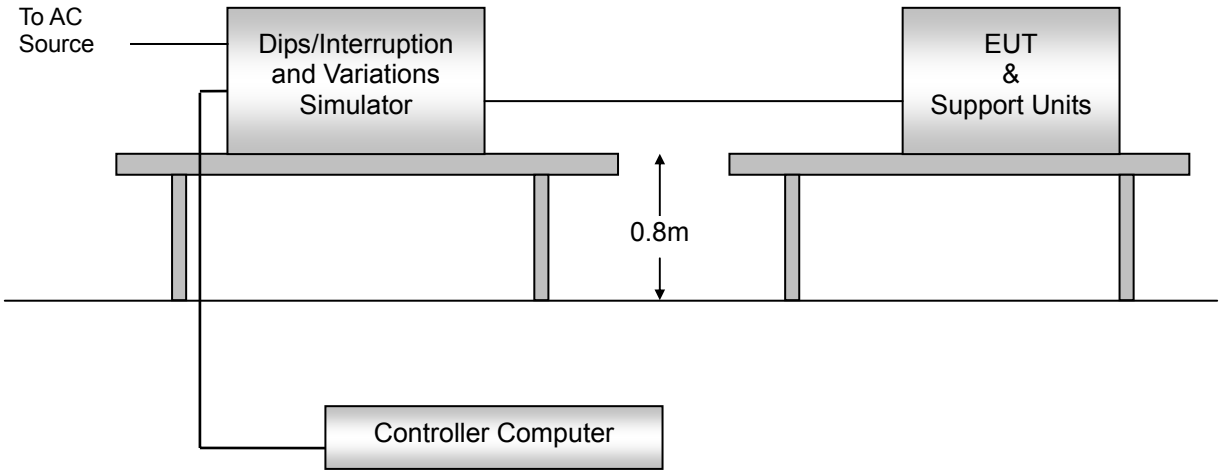
Frequency Band (MHz)	Field Strength (Vrms)	Cable	Injection Method
0.15 ~ 80	3	LAN	Clamp

7.11 VOLTAGE DIPS AND INTERRUPTION

LIMIT

Please refer to EN 61000-4-11.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and EN 61000-4-11 for the measurement methods.

TEST RESULTS

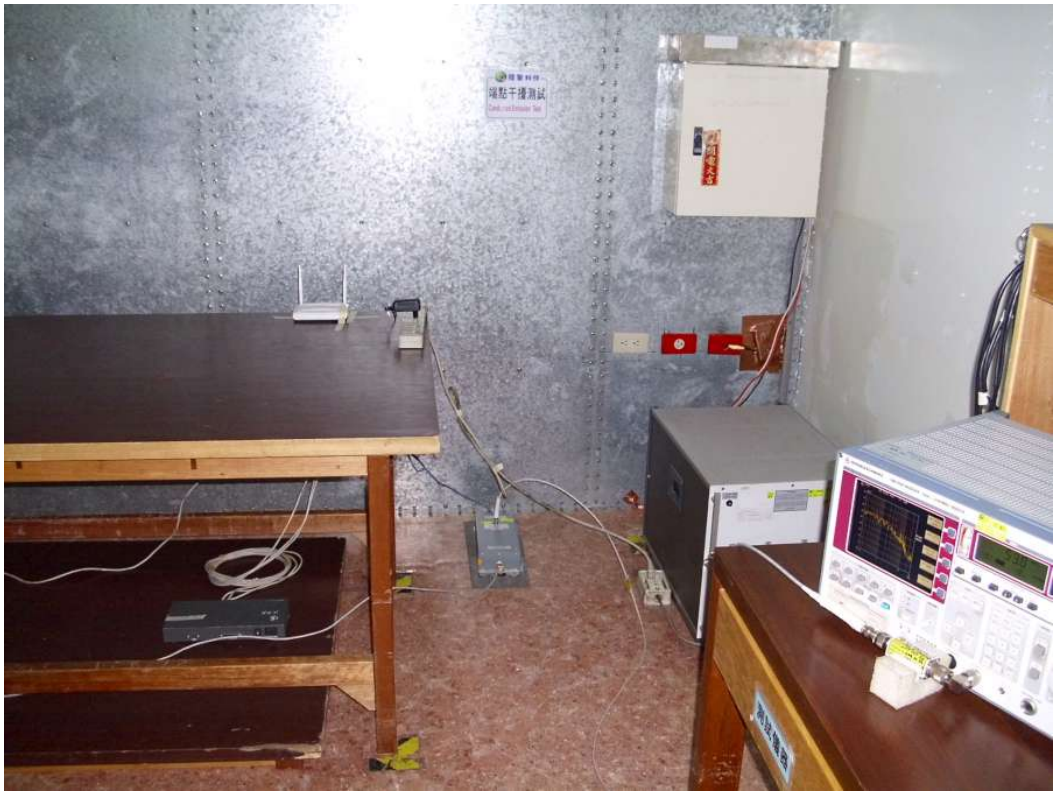
Temperature	26 °C	**Humidity**	46% RH
Pressure	1029 mbar	**Tested By**	Vision Chang
Required Passing Performance	Transient Phenomena: **>95% reduction 10ms & >95% reduction 20ms & 30% reduction 500ms** By User Recoverable Phenomena: **>95% reduction 5000ms**		

Test Power: 230Vac, 50Hz			
Voltage (% Reduction)	**Duration (ms)**	**Criteria**	**Test Result**
>95	0.5&1	☒ A ☐ B ☐ C ☐ D	PASS
30	25	☒ A ☐ B ☐ C ☐ D	PASS
>95	250	☐ A ☒ B ☐ C ☐ D	PASS

8. APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION TEST

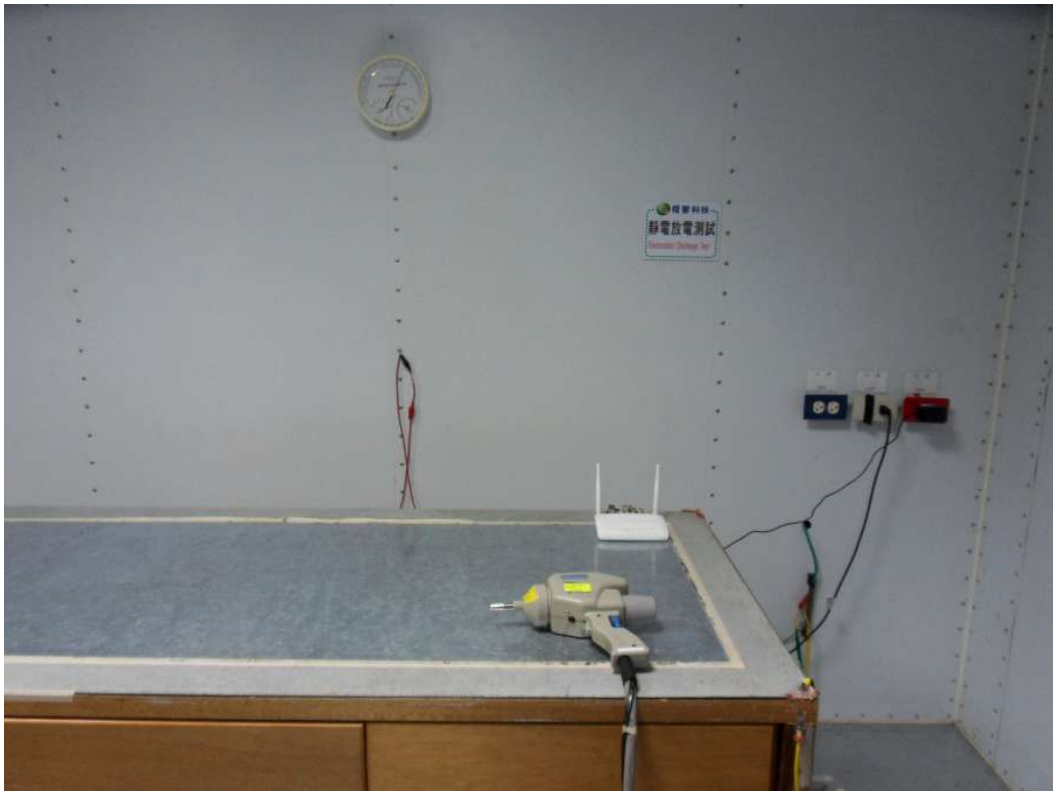
TELECOMMUNICATION PORTS



RADIATED EMISSION TEST

FLICKER TEST

ESD TEST

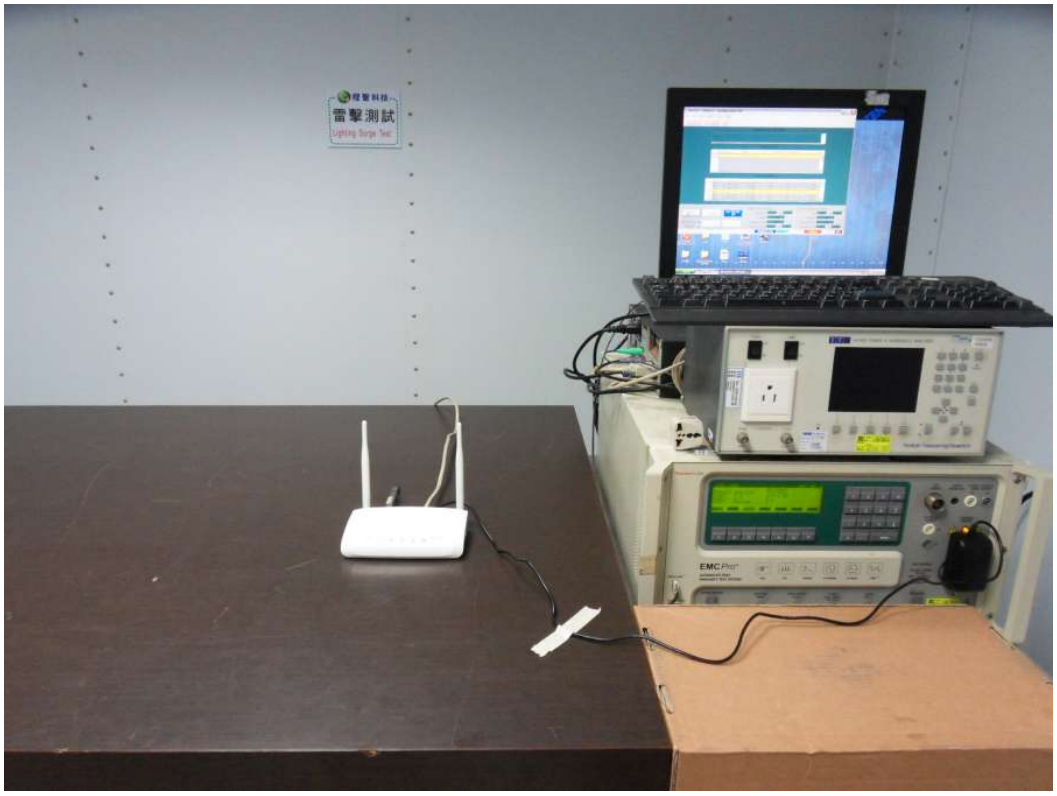


RS TEST

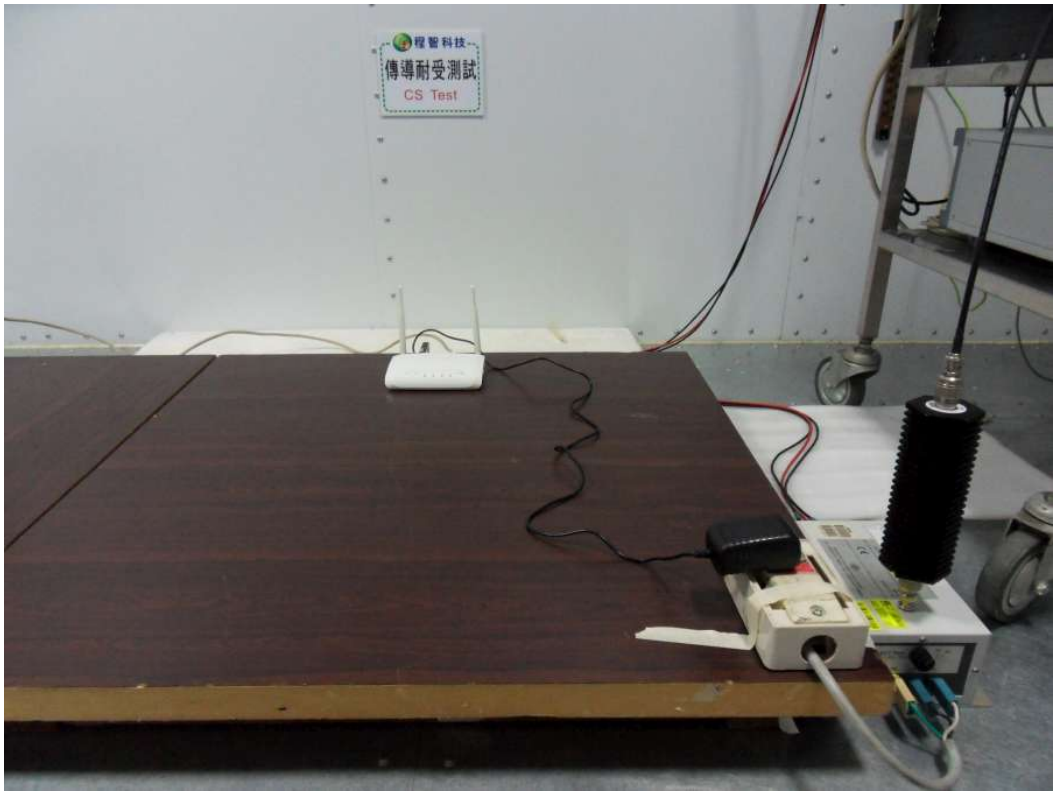
EFT TEST

EFT TEST(Clamp)

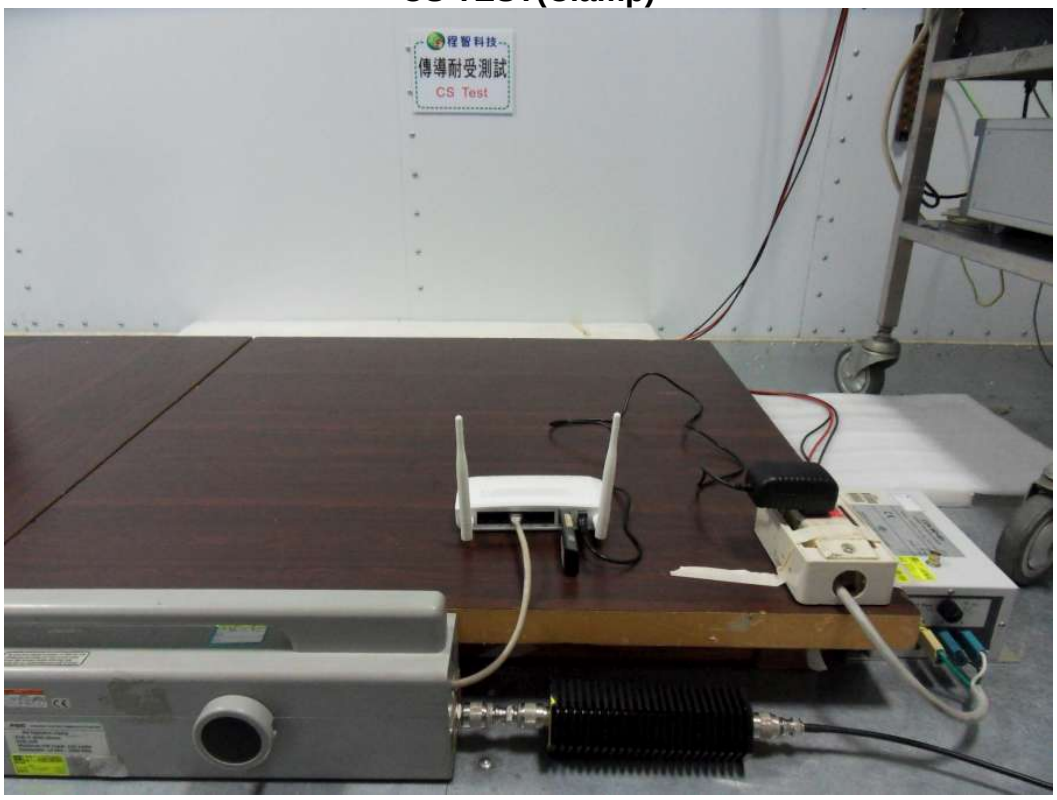
SURGE TEST



CS TEST



CS TEST(Clamp)



VOLTAGE DIP TEST

ETSI EN 301 893 V1.5.1:2008
TEST REPORT

For

Smart 300N Broadband Router

Model : BR485d

Trade Name : E-TOP

Issued for

E-Top Network Technology Inc.

No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
Tainan Lab.
No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
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Issued Date: February 08, 2012

Testing Laboratory
1109

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	February 08, 2012	Initial Issue	ALL	Sunny Chang

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1. TEST REPORT CERTIFICATION

Applicant	**:**	E-Top Network Technology Inc.
Address	**:**	No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.
Manufacture	**:**	E-Top Network Technology Inc.
Address	**:**	No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.
Equipment Under Test	**:**	Smart 300N Broadband Router
Model Number	**:**	BR485d
Brand Name	**:**	E-TOP
Date of Test	**:**	November 29, 2011 ~ December 29, 2011

APPLICABLE STANDARD	
Standard	**Test Result**
ETSI EN 301 893 V1.5.1:2008	PASS

WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.

Approved by:

Jeter Wu
Assistant Manager

Reviewed by:

Eric Huang
Assistant Section Manager

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2. EUT DESCRIPTION

Product Name	Smart 300N Broadband Router
Model Number	BR485d
Identify Number	T11112830801
Received Date	November 28, 2011
Frequency Range	IEEE 802.11a, 802.11n HT20 : 5180MHz ~ 5240MHz, IEEE 802.11n HT40 : 5190MHz ~ 5230MHz,
Transmit Power (mean EIRP)	IEEE 802.11a : 11.64 dBm IEEE 802.11n HT20 : 12.28 dBm IEEE 802.11n HT40 : 11.03 dBm
Channel Spacing	IEEE 802.11a, 802.11n HT20 : 20MHz IEEE 802.11n HT40 : 20MHz
Channel Number	IEEE 802.11a, 802.11n HT20 : 4 Channels IEEE 802.11HT40 : 3 Channels
Transmit Data Rate	IEEE 802.11a : 54, 48 ,36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20 : 130,117,104,78, 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mbps IEEE 802.11n HT40 : 300, 270,243, 216,162 ,135, 121.5, 108, 81, 54, 40.5, 27, 13.5 Mbps
Type of Modulation	IEEE 802.11a : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	**Two antennas (2TX2RX)** Manufacture: YONG-SHUN TECH. CO., LTD. Type: Co-linear dipole structure Model: AN-152RRSU00 Gain: 3dBi for 2.4GHz, 4dBi for 5GHz Connector: Reverse SMA PLUG
Temperature Range	0℃ ~ +40℃
Power Source	**Powered from adapter** Model: JKY36-SP1201000 Input: 100-240Vac, 50/60Hz, 0.5A Output: 12Vdc, 1000mA

Remark :

1.For more details, please refer to the User's manual of the EUT.

2.To add a series model is for business necessary. The different of the each model is shown as bellows:

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Multiple listing:

Company Name/Address	Brand name	Model	Product Name
E-Top Network Technology Inc. No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.	E-TOP	BR485d	Smart 300N Broadband Router
Sapido Technology Inc. No. 383., Sec. 2, Minsheng Rd., West Central District, Tainan 700, Taiwan, R.O.C.	SAPIDO	RB-1830	Smart 300Mbps Dualband Router - All Broadbands

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3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n MIMO transceiver in Smart 300N Broadband Router form factor. It has two transmitter chains and two receive chains (2×2 configurations). The 2 × 2 configuration is implemented with two outside chains (Chain 0, 1).
11a mode, only Chain 0 transmitter.
HT20, HT40 mode only Chain 0 transmitter and two Chain 0, 1 transmitter.

IEEE 802.11a mode, IEEE 802.11n HT20 mode

The EUT had been tested under operating condition.
There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	5180
High	5240

IEEE 802.11a mode : 6Mbps data rate (worst case) were chosen for full testing.
IEEE 802.11n HT20 mode : 13Mbps and 13Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT40 mode

The EUT had been tested under operating condition.
There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	5190
High	5230

IEEE 802.11n HT40 mode : 27Mbps and 27Mbps data rate (worst case) were chosen for full testing.

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4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ETSI EN 301 893 V1.5.1:2008 – Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

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5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Germany	TUV NORD
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

5.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	±0.523 x 10-5
Total RF power, conducted	±1.3dB
RF power density, conducted	±2.5dB
Spurious emissions, conducted	±2.6dB
All emissions, radiated	±4dB
Temperature	±1℃
Humidity	±3.2%
DC and low frequency voltages	±1.8%

Uncertainty figures are valid to a confidence level of 95%, k=2

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6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	Note Book	IBM	T43	DoC	Power cable, unshd, 1.6m

No.	Signal cable description	
A	DC Power	Unshielded, 1.2m, 1pcs
B	LAN Cable	Unshielded, 1.0m, 1pcs

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

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EUT OPERATING CONDITION

RF Setup

1. Set up all computers like the setup diagram.
2. Reset equipment and burn in the test program “MP_Test”.
3. The “Realtek Test Program for “RTL819x ” software was used for testing
   The EUT driver software installed in the host support equipment during testing was Realtek Test Program for RTL819x Drive

(1)TX Mode:

- ⇨ **IC Type: RTL_8192D**
- ⇨ **Mode:5G/SingleMac**
- ⇨ **Dev:WLAN0**
- ⇨ **Test Item :Continuous TX**
- ⇨ **TX POWER: follow “Power Control”**
- ⇨ **Antenna: A Mode A, HT20、HT40 Mode AB**
- ⇨ **Tx Data： 6Mbps** (IEEE 802.11a mode , TX)
  13Mbps (IEEE 802.11n HT20 mode ,chain 0, chain B TX)
  27Mbps (IEEE 802.11n HT40 mode, chain 0, chain B TX**)**
- ⇨ **Bandwith: A、HT20 20MHz, HT40 40MHz**
- ⇨ **Start**

Target Power: IEEE 802.11a Channel Low (5180MHz) = **40**
IEEE 802.11a Channel High (5240MHz) = **40**
Target Power: IEEE 802.11n HT20 Channel Low (5180MHz) = **40 (Chain 0)**
IEEE 802.11 n HT20 Channel High (5240MHz) = **40 (Chain 0)**
IEEE 802.11n HT20 Channel Low (5180MHz) = **40 (Chain 1)**
IEEE 802.11 n HT20 Channel High (5240MHz) = **40 (Chain 1)**
Target Power: IEEE 802.11n HT40 Channel Low (5190MHz) = **40 (Chain 0)**
IEEE 802.11n HT40 Channel High (5230MHz) = **40 (Chain 0)**
IEEE 802.11 n HT40 Channel Low (5190MHz) = **40 (Chain 1)**
IEEE 802.11 n HT40 Channel High (5230MHz) = **40 (Chain 1)**

(2) RX Mode：

Test Item packets RX

Start RX

(3) Normal Link Setup

1. Set up all computers like the setup diagram.
2. All of the function are under run.
3. Notebook PC (2) ping 192.168.0.10 –t to Notebook PC (1).
4. Notebook PC (1) ping 192.168.0.20 –t to Notebook PC (2).
5. Notebook PC (1) ping 192.168.0.50 –t to Wireless Access Point (3).

Start test.

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7.1 CENTRE FREQUENCIES

DEFINITION

ETSI EN 301 893 clause 4.2.1

The centre frequency is the centre of the channel declared by the manufacturer as part of the declared channel plan(s).

LIMITS

ETSI EN 301 893 clause 4.2.2

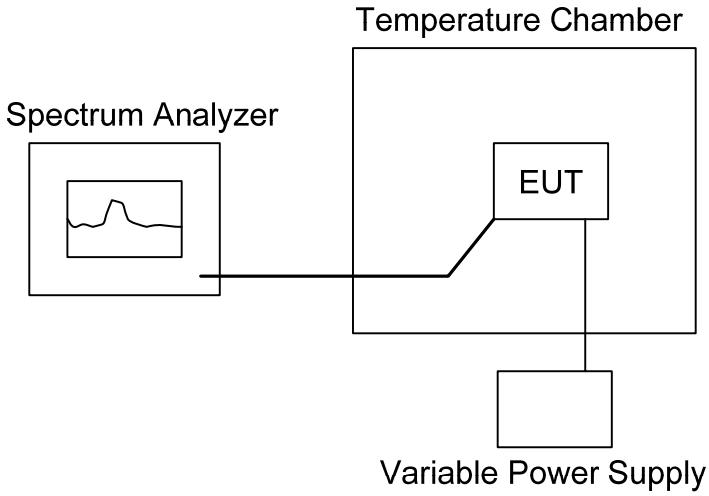
The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range f_c ± 20 ppm.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29, 2012
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2012

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.2.2.1.2 for the measurement method.

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TEST RESULTS

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a / 20℃, 230Vac Normal Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08821	88.21	103.60	-15.39
5240	5240.08818	88.18	104.80	-16.62

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a / 0℃, 207Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08825	88.25	103.60	-15.35
5240	5240.08819	88.19	104.80	-16.61

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a / 0℃, 253Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08813	88.13	103.60	-15.47
5240	5240.08811	88.11	104.80	-16.69

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a / 40℃, 207Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08817	88.17	103.60	-15.43
5240	5240.08815	88.15	104.80	-16.65

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a / 40℃, 253Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08817	88.17	103.60	-15.43
5240	5240.08817	88.17	104.80	-16.63

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT20 / 20℃, 230Vac Normal Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08825	88.25	103.60	-15.35
5240	5240.08829	88.29	104.80	-16.51

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT20 / 0℃, 207Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08821	88.21	103.60	-15.39
5240	5240.08828	88.28	104.80	-16.52

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT20 / 0℃, 253Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08823	88.23	103.60	-15.37
5240	5240.08824	88.24	104.80	-16.56

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT20 / 40℃, 207Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08822	88.22	103.60	-15.38
5240	5240.08823	88.23	104.80	-16.57

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT20 / 40℃, 253Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5180	5180.08823	88.23	103.60	-15.37
5240	5240.08826	88.26	104.80	-16.54

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40 / 20℃, 230Vac Normal Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5190	5190.09694	96.94	103.80	-6.86
5230	5230.09703	97.03	104.60	-7.57

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40 / 0℃, 207Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5190	5190.09696	96.96	103.80	-6.84
5230	5230.09699	96.99	104.60	-7.61

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40 / 0℃, 253Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5190	5190.09695	96.95	103.80	-6.85
5230	5230.09698	96.98	104.60	-7.62

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40 / 40℃, 207Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5190	5190.09691	96.91	103.80	-6.89
5230	5230.09692	96.92	104.60	-7.68

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40 / 40℃, 253Vac Extreme Condition Results	Temp. & Humidity	21.8°C, 55%

Frequency (MHz)	Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (± kHz)	Margin (kHz)
5190	5190.09700	97.00	103.80	-6.80
5230	5230.09698	96.98	104.60	-7.62

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7.2 RF OUTPUT POWER, TRANSMIT POWER CONTROL (TPC) AND POWER DENSITY

DEFINITION

ETSI EN 301 893 clause 4.4.1

RF Output Power : The RF output power is the mean equivalent isotropically radiated power (EIRP) during a transmission burst.

Transmit Power Control (TPC) : Transmit Power Control (TPC) is a mechanism to be used by the RLAN device to ensure a mitigation factor of at least 3 dB on the aggregate power from a large number of devices. This requires the RLAN device to have a TPC range from which the lowest value is at least 6 dB below the values for mean EIRP given in table 1.

TPC is not required for channels whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz.

Power Density : The power density is the mean Equivalent Isotropically Radiated Power (EIRP) density during a transmission burst.

LIMITS

ETSI EN 301 893 clause 4.4.2

RF output power and power density at the highest power level

For devices with TPC, the RF output power and the power density when configured to operate at the highest stated power level of the TPC range shall not exceed the levels given in table 1.

For devices without TPC, the limits in table 1 shall be reduced by 3 dB, except when operating on channels whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz.

Table 1: Mean EIRP limits for RF output power and power density at the highest power level

Frequency Range	Mean EIRP Limit	Mean EIRP Density Limit
5150 MHz to 5350 MHz	23 dBm	10 dBm/MHz
5470 MHz to 5725 MHz	30 dBm (see note)	17 dBm/MHz (see note)

NOTE : For Slave devices without a Radar Interference Detection function the mean EIRP shall be less than 23 dBm and the mean EIRP density shall be less than 10 dBm/MHz.

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RF output power at the lowest power level of the TPC range

For devices using TPC, the RF output power during a transmission burst when configured to operate at the lowest stated power level of the TPC range shall not exceed the levels given in table 2.

Table 2: Mean EIRP limits for RF output power at the lowest power level of the TPC range

Frequency Range	Mean EIRP Limit
5250 MHz to 5350 MHz	17 dBm
5470 MHz to 5725 MHz	24 dBm (see note)

NOTE : For Slave devices without a Radar Interference Detection function the mean EIRP shall be less than 17 dBm.

The limits in table 2 do not apply for devices without TPC or when operating on channels whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2487A	6K00003888	N.C.R
Power Sensor	Anritsu	MA2491A	33265	MAY 30, 2012
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29, 2012
Temp./Humidity Chamber	K.SON	THS-M1	242	MAY 30.2012

Remark: *Each piece of equipment is scheduled for calibration once a year.*

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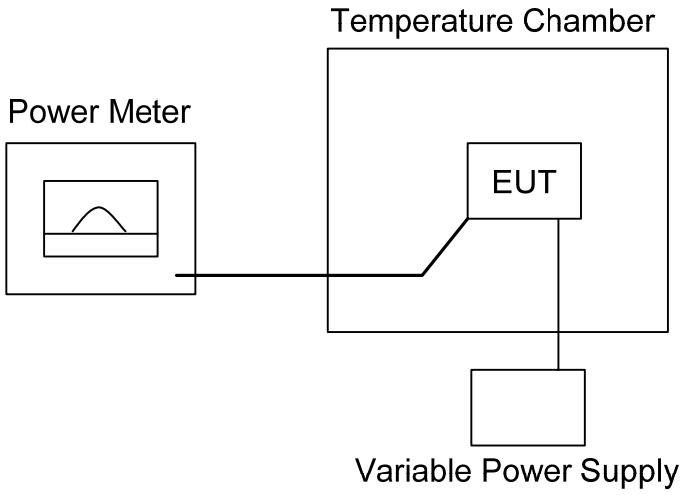
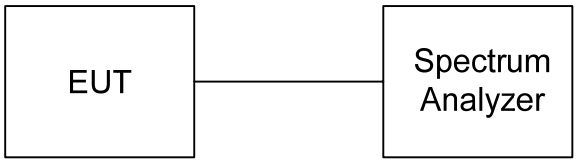
TEST SETUP

Temperature and Voltage Measurement (under normal and extreme test conditions)



Test Configuration for Power Density



TEST PROCEDURE

1. Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.4.1 for the test conditions.
2. Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.4.2 for the measurement method.

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TEST RESULTS

Power Density

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a	Temp. & Humidity	21.8°C, 55%

Duty Cycle measurement X: (Ton/Ton + Toff) = 1.00
10 * log (1/x) = 0.00 dB
Antenna Gain Chain 0: 4 dBi

TEST CONDITIONS			TRANSMITTER POWER (dBm)				
			Frequency (MHz)	Reading (dBm)	Mean EIRP (dBm)	Limit (dBm)	Margin (dB)
T_{nom} (20 °C)	Vnor	230VAC	5180	-12.79	3.51	10	-6.49
			5240	-13.55	2.75	10	-7.25

Remark:

1. *The cable assembly insertion loss of 12.3 dB (including 10 dB pad + 2.3 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
2. *Mean EIRP (dBm) = Reading (dBm) + Antenna Gain (dBi) + 10 * log (1/x).*

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT20	Temp. & Humidity	21.8°C, 55%

Duty Cycle measurement X: (Ton/Ton + Toff) = 1.00
10 * log (1/x) = 0.00 dB
Antenna Gain Chain 0: 4 dBi

TEST CONDITIONS		TRANSMITTER POWER (dBm)					
		Frequency (MHz)	Reading (dBm)		Mean EIRP (dBm)	Limit (dBm)	Margin (dB)
Temperature (°C)	Voltage (V)		Chain 0	Chain 1			
20°C	230V	5180	-15.47	-15.22	3.967098603	10	-6.032901397
		5240	-16.32	-15.3	3.530176503	10	-6.469823497

Remark:

1. *The cable assembly insertion loss of 16.1 dB (including 10 dB pad + 2.3 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
2. *Mean EIRP (dBm) = Reading (dBm) + Antenna Gain (dBi) + 10 * log (1/x).*

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40	Temp. & Humidity	21.8°C, 55%

Duty Cycle measurement X: (Ton/Ton + Toff) =	1.00	
10 * log (1/x) =	0.00	dB
Antenna Gain Chain 0:	4	dBi

TEST CONDITIONS		TRANSMITTER POWER (dBm)					
		Frequency (MHz)	Reading (dBm)		Mean EIRP (dBm)	Limit (dBm)	Margin (dB)
Temperature (°C)	Voltage (V)		Chain 0	Chain 1			
20°C	230V	5190	-19.03	-18.33	0.64438805	10	-9.35561195
		5230	-19.68	-19.04	-0.03792146	10	-10.03792146

Remark:

1. *The cable assembly insertion loss of 16.1 dB (including 10 dB pad + 2.3 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
2. *Mean EIRP (dBm) = Reading (dBm) + Antenna Gain (dBi) + 10 * log (1/x).*

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OUTPUT POWER

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a	Temp. & Humidity	21.8°C, 55%

Duty Cycle measurement X: (Ton/Ton + Toff) =	1.00
10 * log (1/x) =	0.00 dB
Antenna Gain Chain 0:	4 dBi

TEST CONDITIONS			Frequency (MHz)	Reading (dBm/MHz)	Mean EIRP Density (dBm/MHz)	Mean EIRP Density Limit (dBm/MHz)	Margin (dB)
T_{nom} (25°C)	Vnor	230VAC	5180	10.31	15.11	23.00	-7.89
			5240	9.72	14.52	23.00	-8.48
T_{nom} (0°C)	Vnor	207VAC	5180	13.51	18.31	23.00	-4.69
			5240	12.91	17.71	23.00	-5.29
T_{nom} (0°C)	Vnor	253VAC	5180	13.79	18.59	23.00	-4.41
			5240	13.22	18.02	23.00	-4.98
T_{nom} (55°C)	Vnor	207VAC	5180	7.72	12.52	23.00	-10.48
			5240	7.15	11.95	23.00	-11.05
T_{nom} (55°C)	Vnor	253VAC	5180	7.69	12.49	23.00	-10.51
			5240	7.24	12.04	23.00	-10.96

Remark:

1. *The cable assembly insertion loss of 0.8 dB was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
2. *Mean EIRP Density (dBm/MHz) = Reading (dBm/MHz) + Antenna Gain (dBi) + 10 * log (1/x).*

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT20	Temp. & Humidity	21.8°C, 55%

Duty Cycle measurement X: (Ton/Ton + Toff) =	1.00	
10 * log (1/x) =	0.00	dB
Antenna Gain Chain 0:	4	dBi

TEST CONDITIONS			Frequency (MHz)	Reading (dBm/MHz)		Mean EIRP Density (dBm/MHz)	Mean EIRP Density Limit (dBm/MHz)	Margin (dB)
				Chain 0	Chain 1			
T_{nom} (25°C)	Vnor	230VAC	5180	6.95	6.44	14.51	23.00	-8.49
			5240	6.28	6.12	14.01	23.00	-8.99
T_{nom} (0°C)	Vnor	207VAC	5180	10.19	9.56	17.70	23.00	-5.30
			5240	9.67	9.34	17.32	23.00	-5.68
T_{nom} (0°C)	Vnor	253VAC	5180	9.95	9.42	17.50	23.00	-5.50
			5240	9.54	9.28	17.22	23.00	-5.78
T_{nom} (55°C)	Vnor	207VAC	5180	4.38	3.94	11.98	23.00	-11.02
			5240	3.79	3.65	11.53	23.00	-11.47
T_{nom} (55°C)	Vnor	253VAC	5180	4.25	3.8	11.84	23.00	-11.16
			5240	3.62	3.43	11.34	23.00	-11.66

Remark:

1. *The cable assembly insertion loss of 0.8 dB was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
2. *Mean EIRP (dBm/MHz) = Reading (dBm/MHz) + Antenna Gain (dBi) + 10 * log (1/x).*
3. *Total Mean EIRP Density = Mean EIRP Chain 0 + Mean EIRP Chain 1.*

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40	Temp. & Humidity	21.8°C, 55%

Duty Cycle measurement X: (Ton/Ton + Toff) =	1.00	
10 * log (1/x) =	0.00	dB
Antenna Gain Chain 0:	4	dBi

TEST CONDITIONS			Frequency (MHz)	Reading (dBm/MHz)		Mean EIRP Density (dBm/MHz)	Mean EIRP Density Limit (dBm/MHz)	Margin (dB)
				Chain 0	Chain 1			
T_{nom} (25°C)	Vnor	230VAC	5180	6.94	6.13	14.36	23.00	-8.64
			5230	6.14	5.87	13.82	23.00	-9.18
T_{nom} (0°C)	Vnor	207VAC	5180	9.97	9.45	17.53	23.00	-5.47
			5230	9.39	9.14	17.08	23.00	-5.92
T_{nom} (0°C)	Vnor	253VAC	5180	9.88	9.12	17.33	23.00	-5.67
			5230	9.24	8.96	16.91	23.00	-6.09
T_{nom} (55°C)	Vnor	207VAC	5180	4.42	3.92	11.99	23.00	-11.01
			5230	3.67	3.54	11.42	23.00	-11.58
T_{nom} (55°C)	Vnor	253VAC	5180	4.41	3.85	11.95	23.00	-11.05
			5230	3.77	3.61	11.50	23.00	-11.50

Remark:

1. *The cable assembly insertion loss of 0.8 dB was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
2. *Mean EIRP (dBm/MHz) = Reading (dBm/MHz) + Antenna Gain (dBi) + 10 * log (1/x).*
3. *Total Mean EIRP Density = Mean EIRP Chain 0 + Mean EIRP Chain 1.*

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7.3 TRANSMITTER UNWANTED EMISSIONS OUTSIDE THE 5 GHZ RLAN BANDS

DEFINITION

ETSI EN 301 893 clause 4.5.1.1

These are radio frequency emissions outside the 5 GHz RLAN bands.

LIMITS

ETSI EN 301 893 clause 4.5.1.2

The level of unwanted emission shall not exceed the limits given in table 3.

Table 3: Transmitter unwanted emission limits outside the 5 GHz RLAN bands

Frequency Range	Maximum Power, ERP	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87.5MHz	-36 dBm	100 kHz
87.5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1GHz	-36 dBm	100 kHz
1 GHz to 5.15 GHz	-30 dBm	1 MHz
5.35 GHz to 5.47 GHz	-30 dBm	1 MHz
5.725 GHz to 26GHz	-30 dBm	1 MHz

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TEST EQUIPMENT

Open Area Test Site # 6				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
TYPE N COAXIAL CABLE	SUHNER	CHA9513	6	NOV. 17, 2012
BI-LOG Antenna	Sunol	JB1	A070506-2	OCT. 03, 2012
LOOP ANTENNA	EMCO	6502	8905-2356	JUN. 10, 2012
Pre-Amplifier	HP	8447F	2944A03817	NOV. 23, 2012
EMI Receiver	R&S	ESVS10	833206/012	MAY 10, 2012
RF Cable	SUHNER	SUCOFLEX104PEA	20520/4PEA	NOV. 10, 2012
Horn Antenna	Com-Power	AH-118	071032	DEC. 27, 2012
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29,2012
Pre-Amplifier	MITEQ	AFS44-00108650-42-10P-44	1205908	NOV. 23, 2012
3116 Double Ridge Antenna (40G)	ETS-LINDGREN	EMCO-003	00078	NOV. 14, 2012
Turn Table	Yo Chen	001	----------	N.C.R.
Antenna Tower	AR	TP1000A	309874	N.C.R.
Controller	CT	SC101	----------	N.C.R.
RF Swicth	E-INSTRUMENT TELH LTD	ERS-180A	EC1204141	N.C.R
Power Meter	Anritsu	ML2487A	6K00003888	MAY 30, 2012
Power Sensor	Anritsu	MA2491A	33265	MAY 30.2012
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2012
Signal Generator	HP	8673C	2938A00663	SEP. 12, 2012
DC Power Source	LOKO	DSP-5050	L1507009282	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

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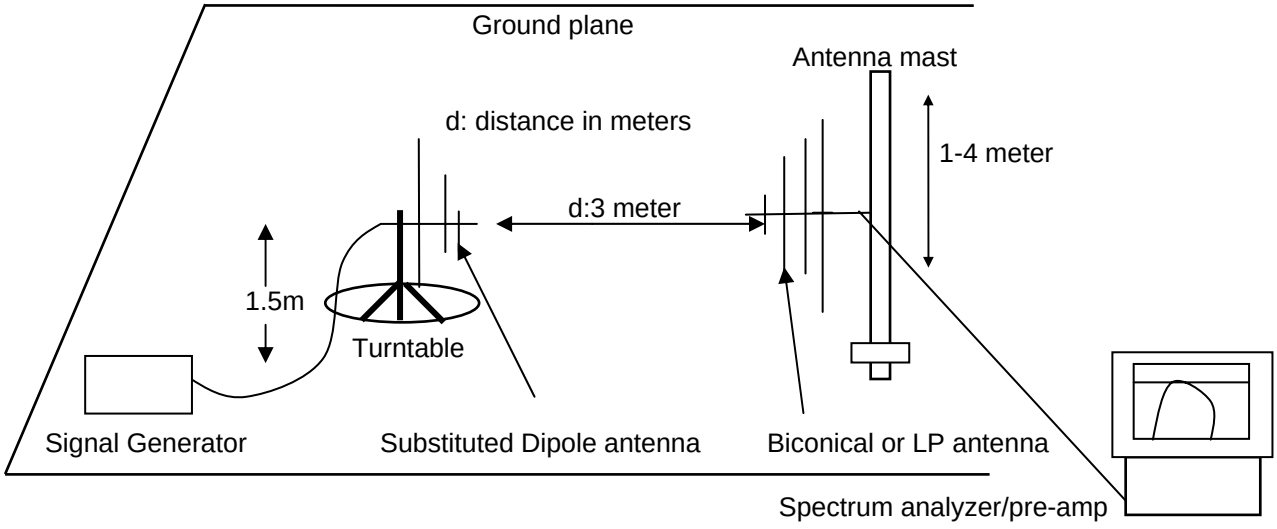
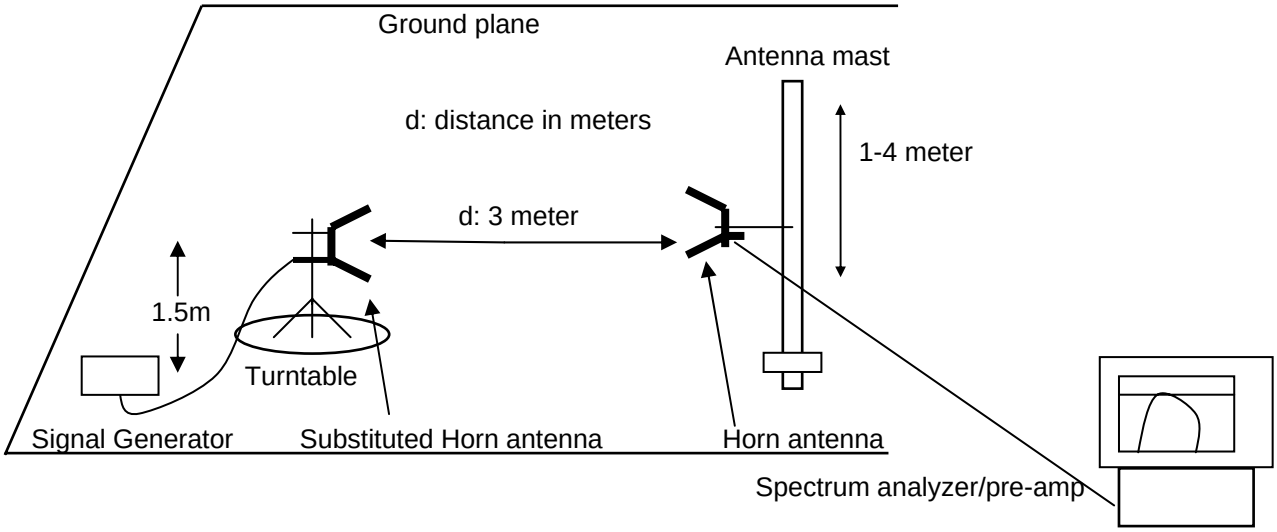
TEST SETUP

Substitution Measurement setup below 1GHz



Substitution Measurement setup above 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission below 1GHz.

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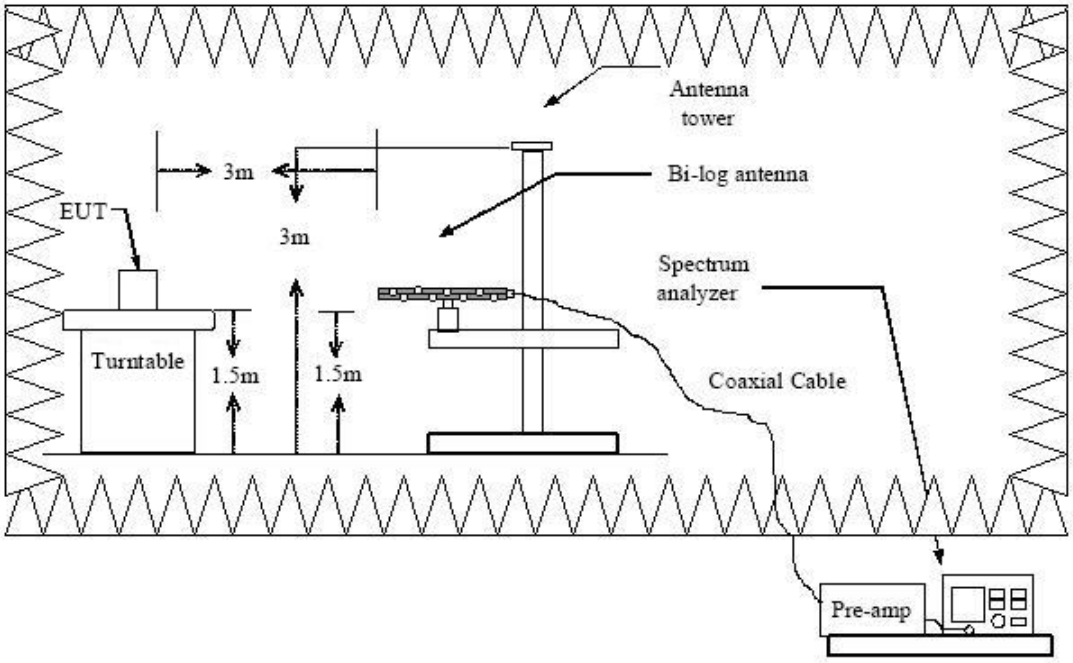
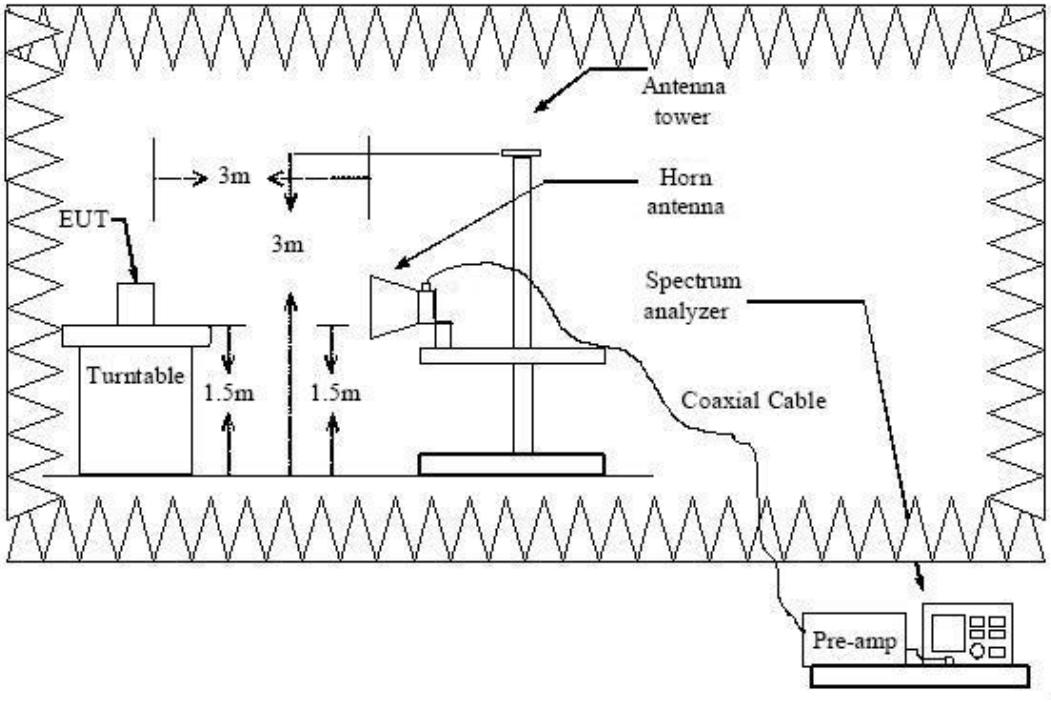


The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.5.1 for the test conditions.
2. Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.5.2 for the measurement method.

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TEST RESULTS

Below 1GHz

After we verified, the IEEE 802.11n HT20 mode of channel Low is worse case.

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/12/29
Test Mode	IEEE 802.11n HT20 TX / CH Low	Temp. & Humidity	21.9°C, 58%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
110.24	56.69	H	-56.55	-54.00	-2.55	-4.09
250.00	38.84	H	-73.31	-36.00	-37.31	-3.00
312.45	39.85	H	-70.64	-36.00	-34.64	-1.34
468.53	43.49	H	-63.02	-36.00	-27.02	2.64
500.04	42.07	H	-64.21	-54.00	-10.21	2.87
937.20	34.10	H	-64.22	-36.00	-28.22	10.83
51.72	60.93	V	-55.74	-54.00	-1.74	-7.52
110.80	54.56	V	-55.13	-54.00	-1.13	-0.54
250.03	42.26	V	-67.83	-36.00	-31.83	-0.94
371.28	40.07	V	-67.68	-36.00	-31.68	1.40
500.00	37.22	V	-66.28	-54.00	-12.28	5.65
937.32	33.79	V	-61.45	-36.00	-25.45	13.91

Remark:

1. *The emission behaviour belongs to narrowband spurious emission*
2. *According to technical experiences, all spurious emissions at all channels are almost the same below 1GHz, so that the channel low was chosen as representative for the test.*

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Above 1GHz

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a TX / CH Low	Temp. & Humidity	20.9°C, 56%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
6187.69	51.27	H	-49.37	-30.00	-19.37	8.51
10360.03	43.28	H	-49.09	-30.00	-19.09	16.78
6187.72	53.79	V	-47.78	-30.00	-17.78	7.58
10360.02	44.19	V	-49.07	-30.00	-19.07	15.89

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a TX / CH High	Temp. & Humidity	20.9°C, 56%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
6187.65	50.84	H	-49.80	-30.00	-19.80	8.51
10480.05	43.92	H	-48.44	-30.00	-18.44	16.79
6187.68	53.97	V	-47.60	-30.00	-17.60	7.58
10480.00	44.75	V	-48.06	-30.00	-18.06	16.34

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT20 TX / CH Low	Temp. & Humidity	20.9°C, 56%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
6187.69	50.22	H	-50.42	-30.00	-20.42	8.51
10360.03	43.92	H	-48.45	-30.00	-18.45	16.78
6187.66	53.41	V	-48.16	-30.00	-18.16	7.58
10360.03	45.11	V	-48.15	-30.00	-18.15	15.89

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11a TX / CH High	Temp. & Humidity	20.9°C, 56%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
6187.72	50.73	H	-49.91	-30.00	-19.91	8.51
10480.05	43.28	H	-49.08	-30.00	-19.08	16.79
6187.70	52.96	V	-48.61	-30.00	-18.61	7.58
10480.04	44.50	V	-48.31	-30.00	-18.31	16.34

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

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Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40 TX / CH Low	Temp. & Humidity	20.9°C, 56%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
6187.68	50.07	H	-50.57	-30.00	-20.57	8.51
10360.04	42.94	H	-49.43	-30.00	-19.43	16.78
6187.68	53.69	V	-47.88	-30.00	-17.88	7.58
10360.04	44.33	V	-48.93	-30.00	-18.93	15.89

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	IEEE 802.11n HT40 TX / CH High	Temp. & Humidity	20.9°C, 56%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
6187.64	50.37	H	-50.27	-30.00	-20.27	8.51
10460.03	43.46	H	-48.90	-30.00	-18.90	16.79
6187.69	53.10	V	-48.47	-30.00	-18.47	7.58
10460.04	45.27	V	-47.62	-30.00	-17.62	16.26

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

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7.4 TRANSMITTER UNWANTED EMISSIONS WITHIN THE 5 GHZ RLAN BANDS

DEFINITION

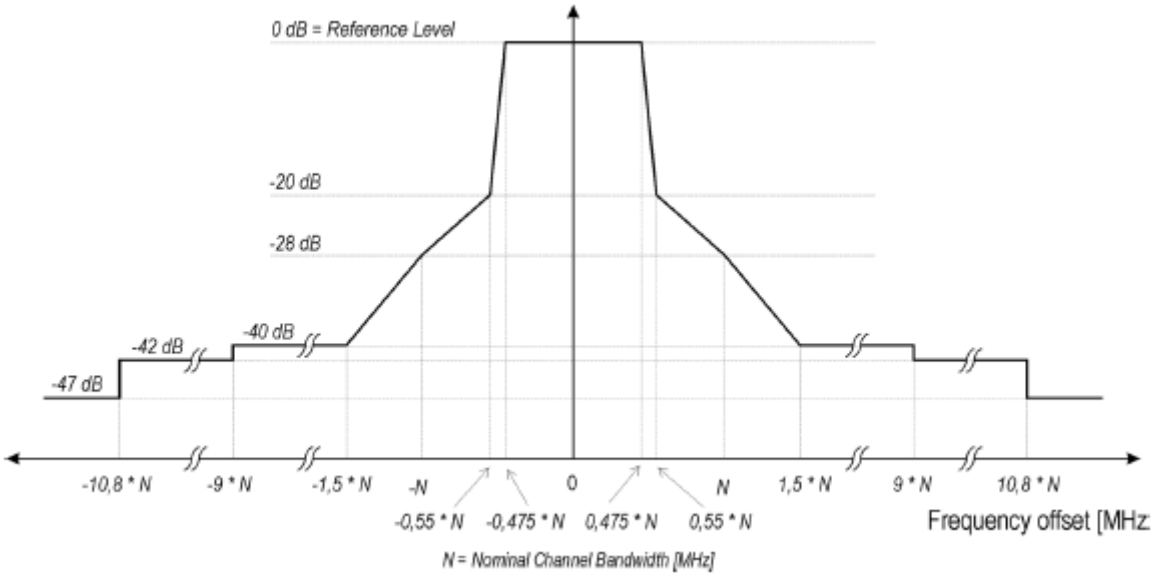
ETSI EN 301 893 clause 4.5.2.1

These are radio frequency emissions within the 5 GHz RLAN bands.

LIMITS

ETSI EN 301 893 clause 4.5.2.2

Figure 1: Transmit spectral power mask



Note: dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

The average level of transmitter unwanted emissions within the 5 GHz RLAN bands shall not exceed the limit of the mask provided in figure 1 or the limit for unwanted emissions provided in table 3, whichever is the higher.

NOTE: The mask is only applicable within the band of operation. Beyond the band edges the requirements of clause 4.5.1 apply.

In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.

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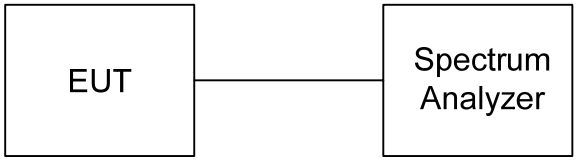
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29, 2012

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

1. Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.6.1 for the test conditions.
2. Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.6.2 for the measurement method.

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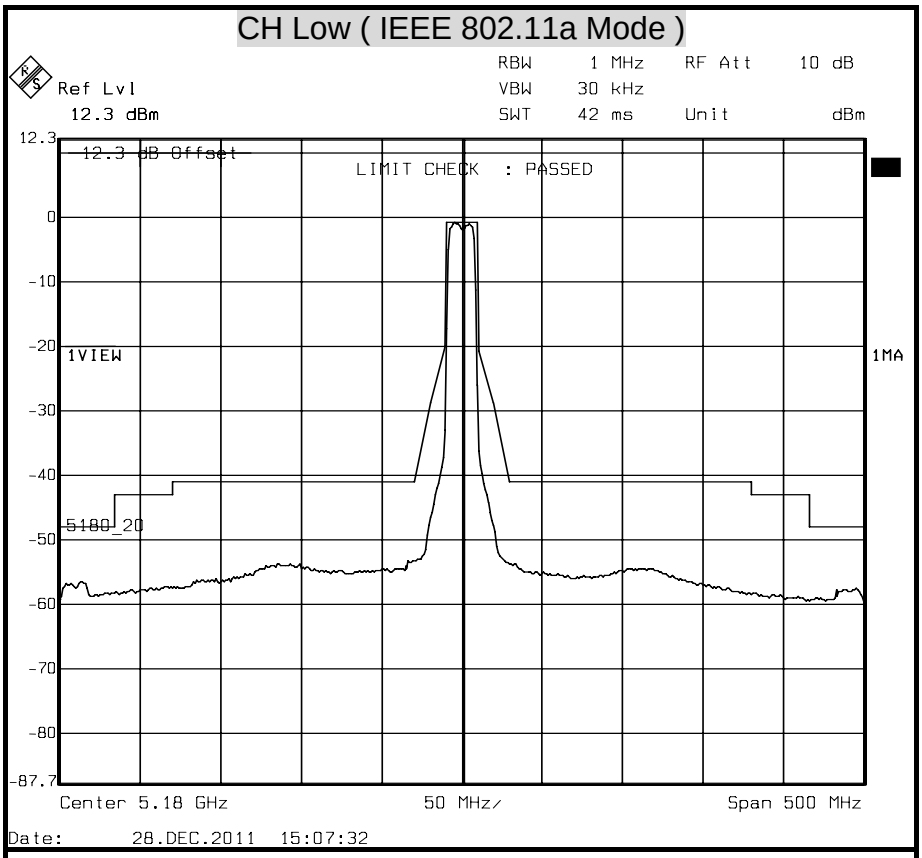
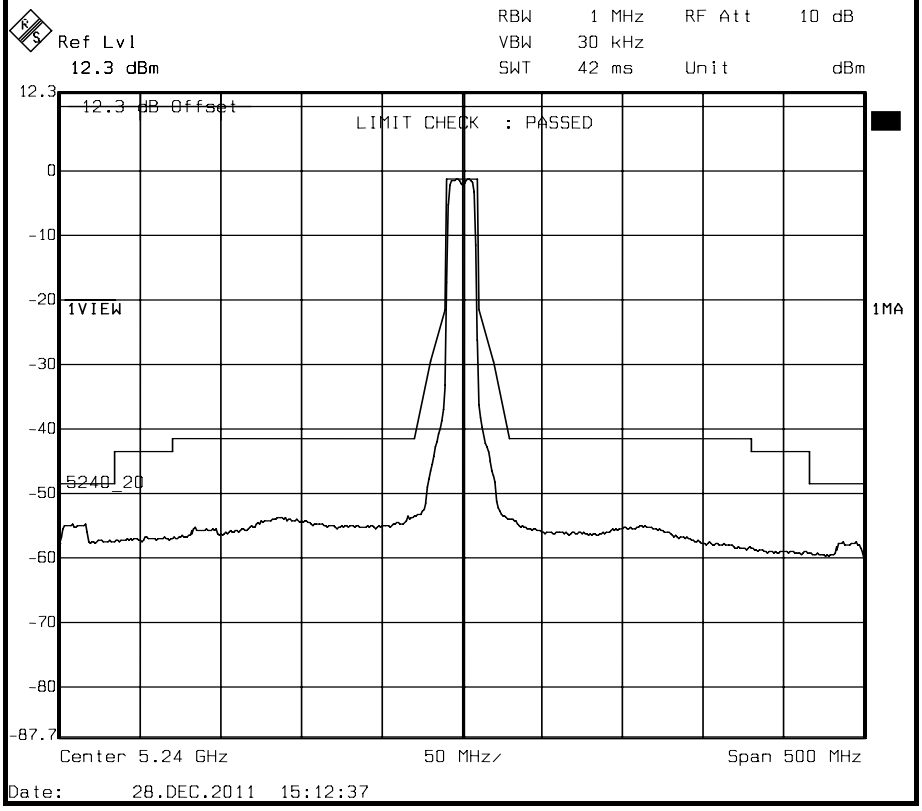
TEST RESULTS

CH Low (IEEE 802.11a Mode)



CH High (IEEE 802.11a Mode)



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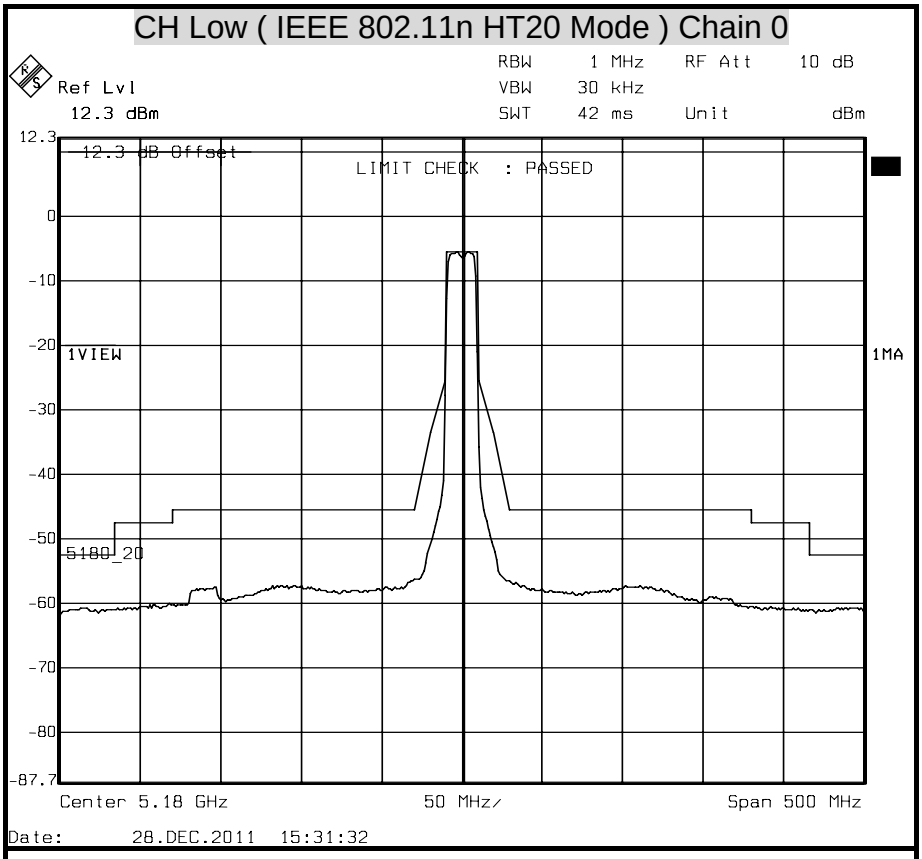
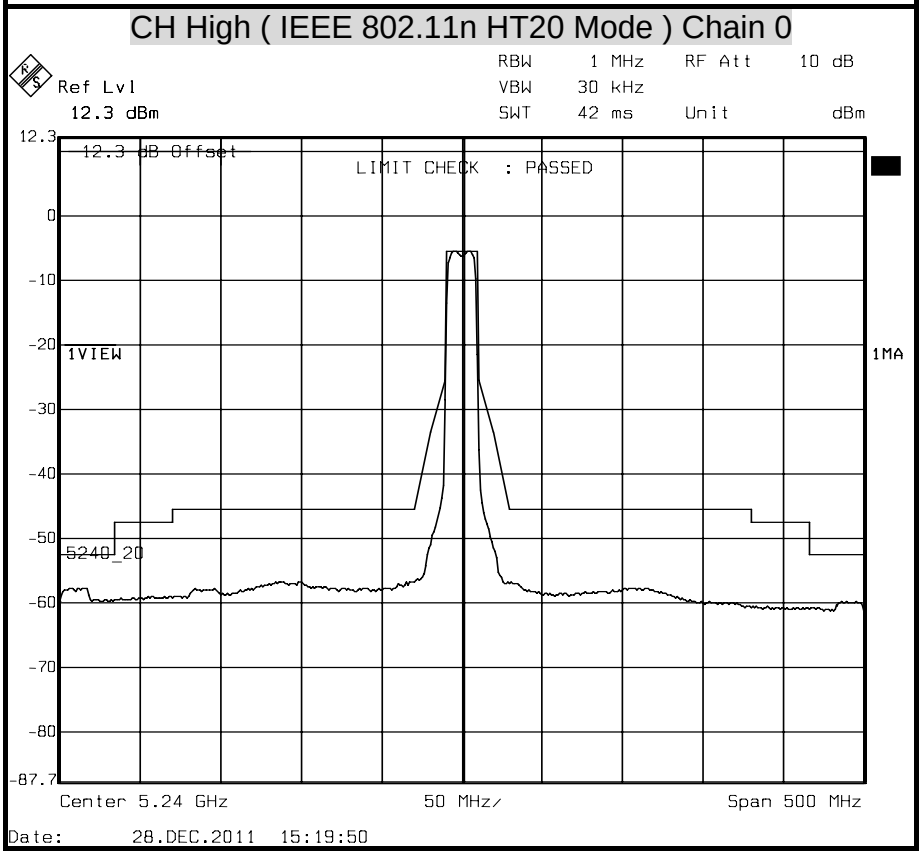
CH Low (IEEE 802.11n HT20 Mode) Chain 0



CH High (IEEE 802.11n HT20 Mode) Chain 0



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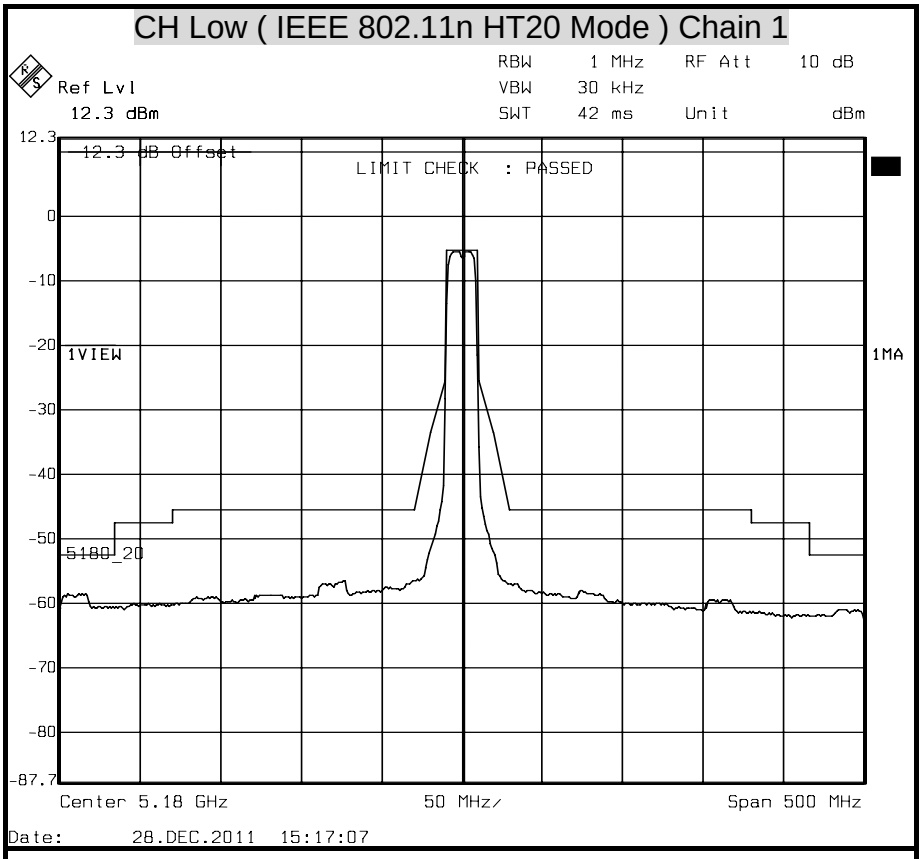
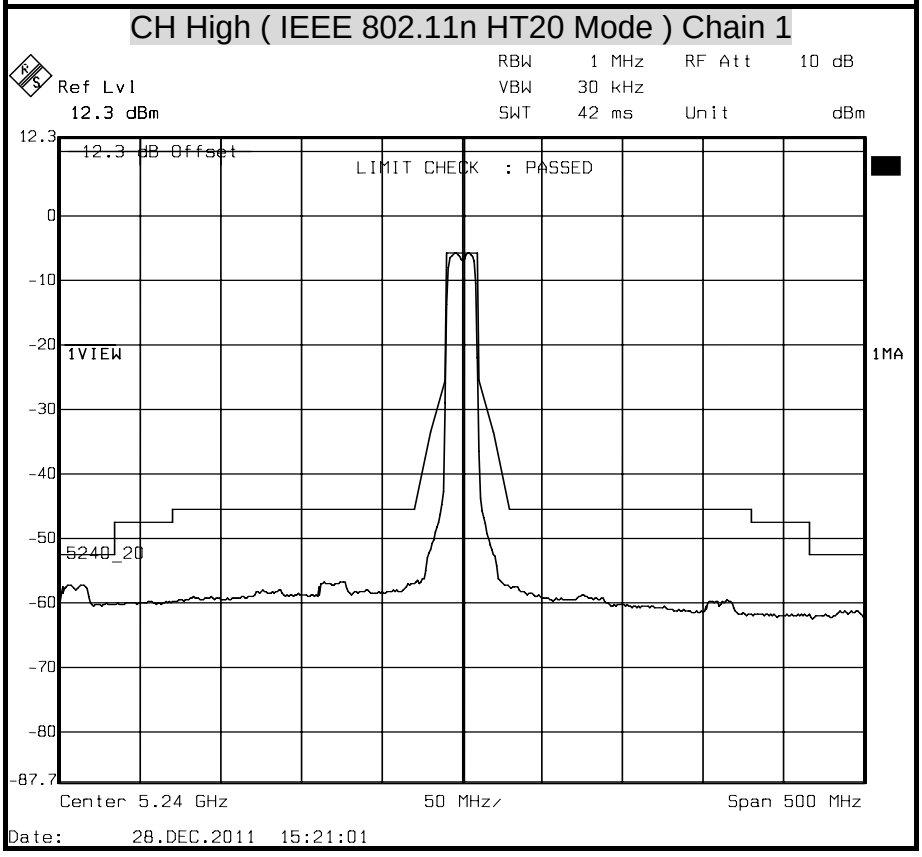
CH Low (IEEE 802.11n HT20 Mode) Chain 1



CH High (IEEE 802.11n HT20 Mode) Chain 1



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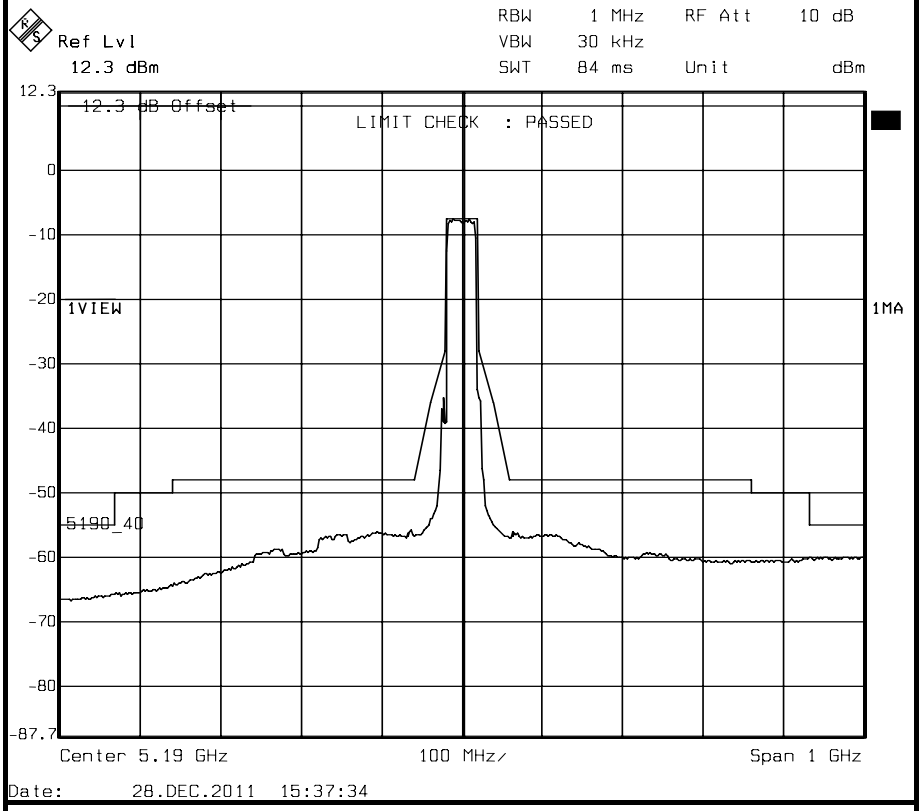
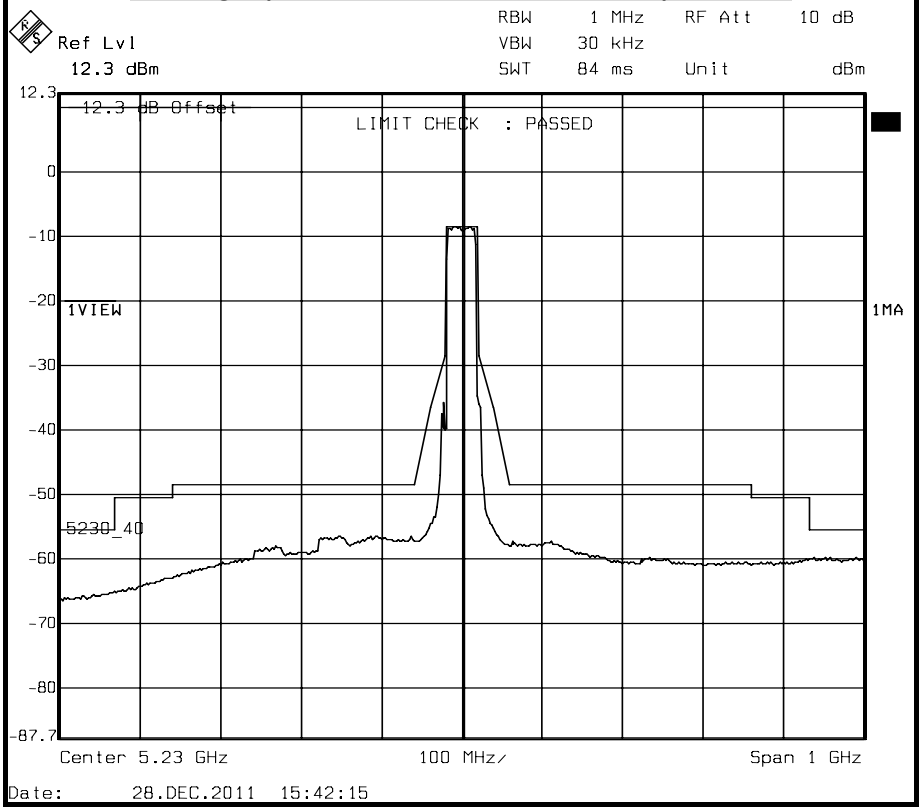
CH Low (IEEE 802.11n HT40 Mode) Chain 0



CH High (IEEE 802.11n HT40 Mode) Chain 0



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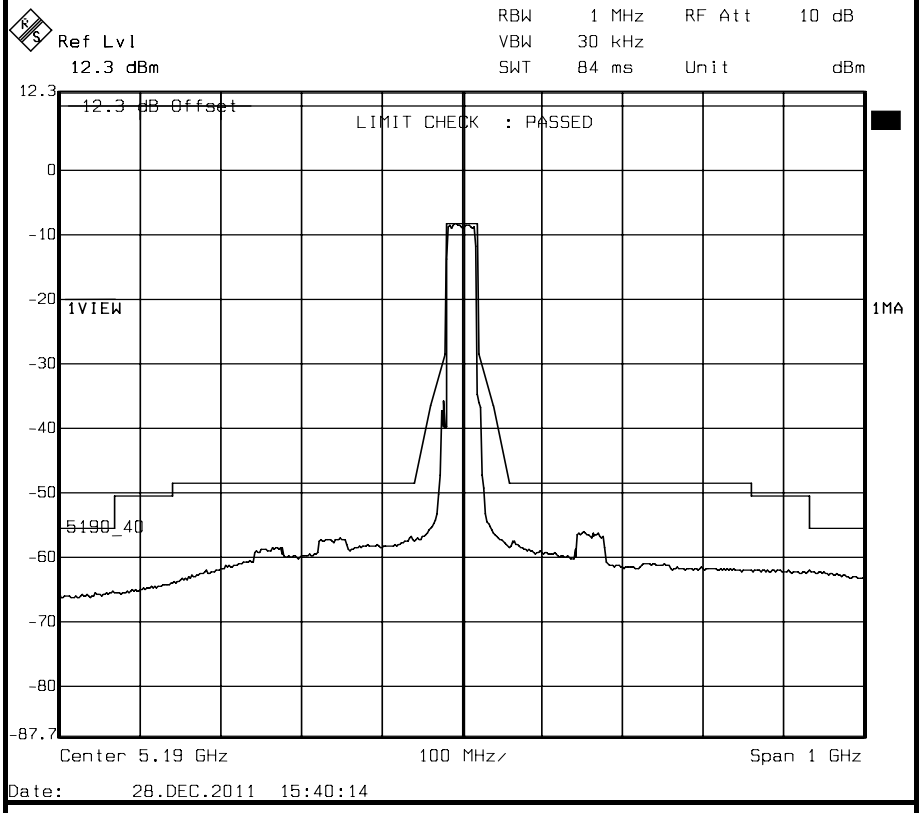
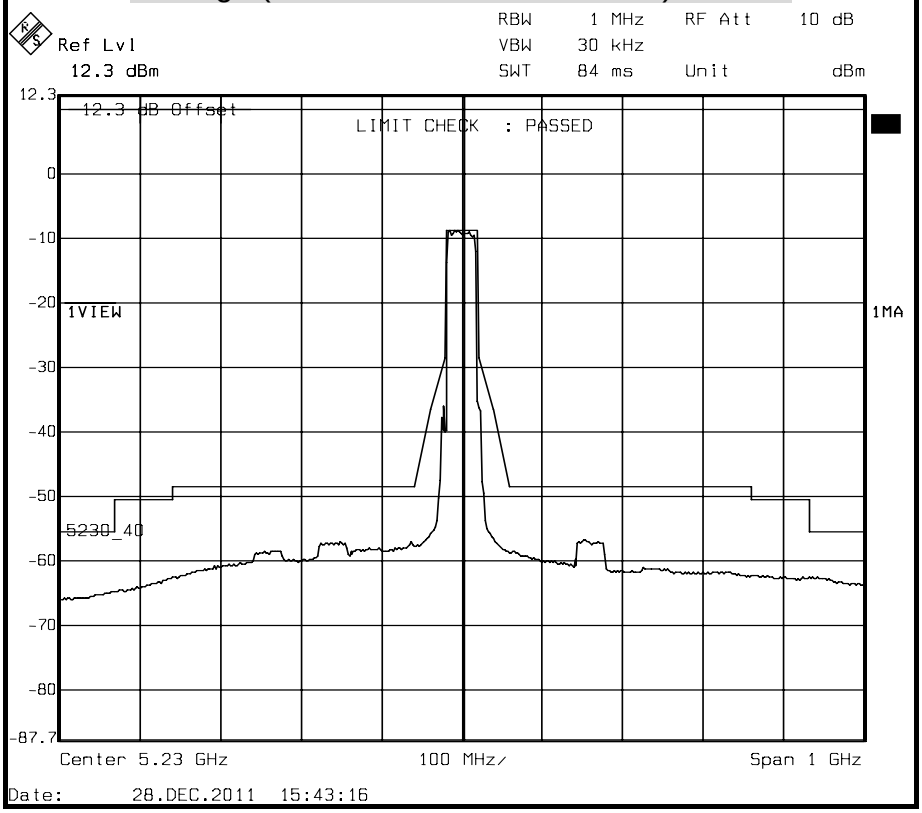
CH Low (IEEE 802.11n HT40 Mode) Chain 1



CH High (IEEE 802.11n HT40 Mode) Chain 1



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7.5 RECEIVER SPURIOUS EMISSIONS

DEFINITION

ETSI EN 301 893 clause 4.6.1

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

LIMITS

ETSI EN 301 893 clause 4.6.2

The spurious emissions of the receiver shall not exceed the limits given in table 4.

Table 4: Spurious radiated emission limits

Frequency Range	Maximum Power, ERP	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 26 GHz	-47 dBm	1 MHz

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TEST EQUIPMENT

Open Area Test Site # 6				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
TYPE N COAXIAL CABLE	SUHNER	CHA9513	6	NOV. 17, 2012
BI-LOG Antenna	Sunol	JB1	A070506-2	OCT. 03, 2012
LOOP ANTENNA	EMCO	6502	8905-2356	JUN. 10, 2012
Pre-Amplifier	HP	8447F	2944A03817	NOV. 23, 2012
EMI Receiver	R&S	ESVS10	833206/012	MAY 10, 2012
RF Cable	SUHNER	SUCOFLEX104PEA	20520/4PEA	NOV. 10, 2012
Horn Antenna	Com-Power	AH-118	071032	DEC. 27, 2012
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29,2012
Pre-Amplifier	MITEQ	AFS44-00108650-42-10P-44	1205908	NOV. 23, 2012
3116 Double Ridge Antenna (40G)	ETS-LINDGREN	EMCO-003	00078	NOV. 14, 2012
Turn Table	Yo Chen	001	----------	N.C.R.
Antenna Tower	AR	TP1000A	309874	N.C.R.
Controller	CT	SC101	----------	N.C.R.
RF Swicth	E-INSTRUMENT TELH LTD	ERS-180A	EC1204141	N.C.R
Power Meter	Anritsu	ML2487A	6K00003888	MAY 30, 2012
Power Sensor	Anritsu	MA2491A	33265	MAY 30.2012
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2012
Signal Generator	HP	8673C	2938A00663	SEP. 12, 2012
DC Power Source	LOKO	DSP-5050	L1507009282	N.C.R

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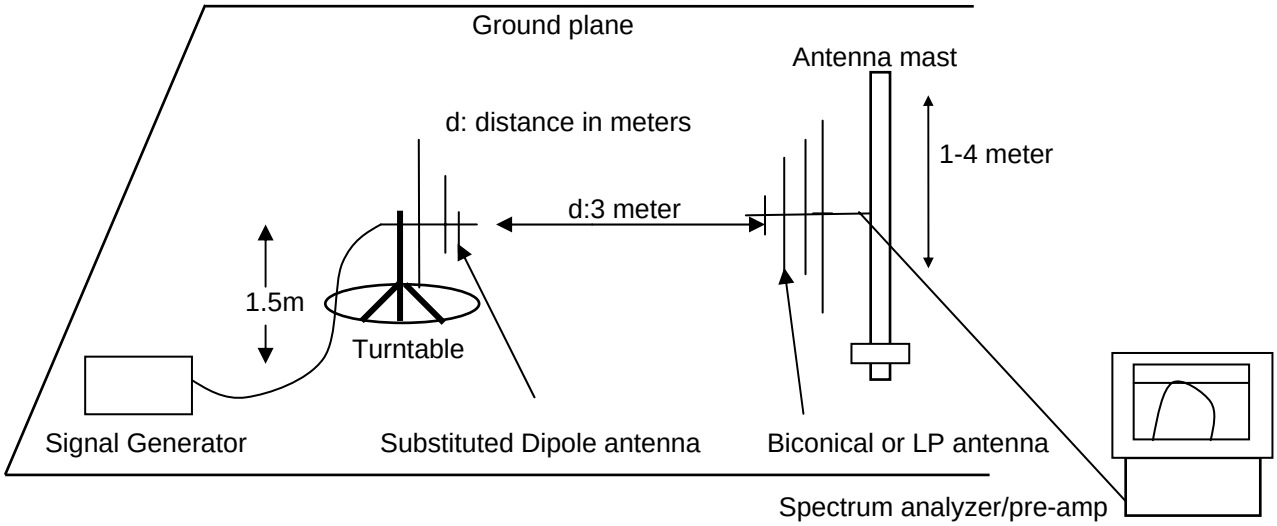
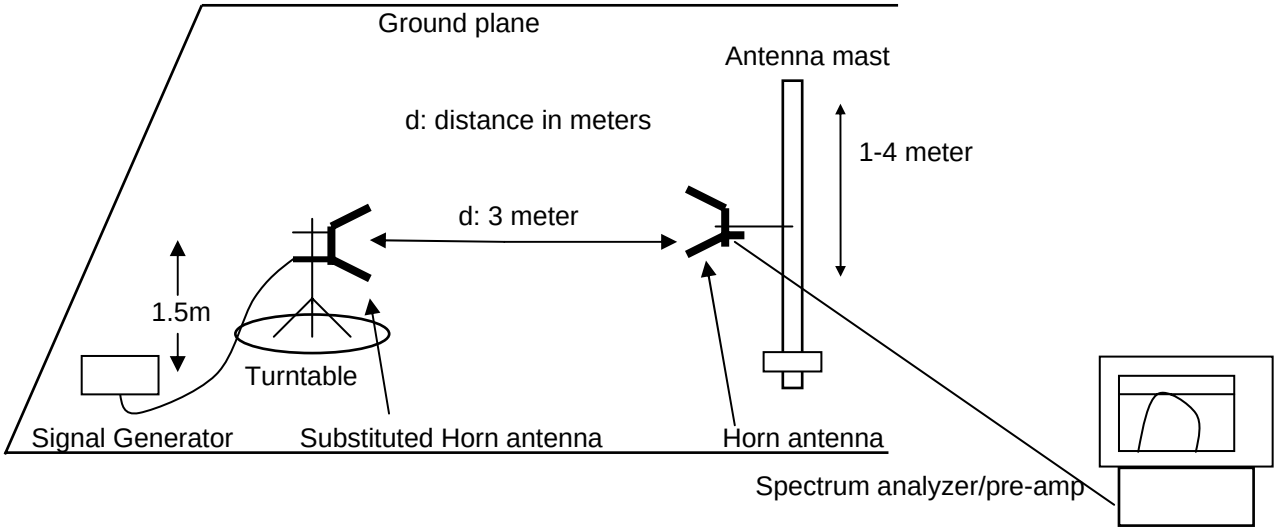
TEST SETUP

Substitution Measurement setup below 1GHz



Substitution Measurement setup above 1GHz



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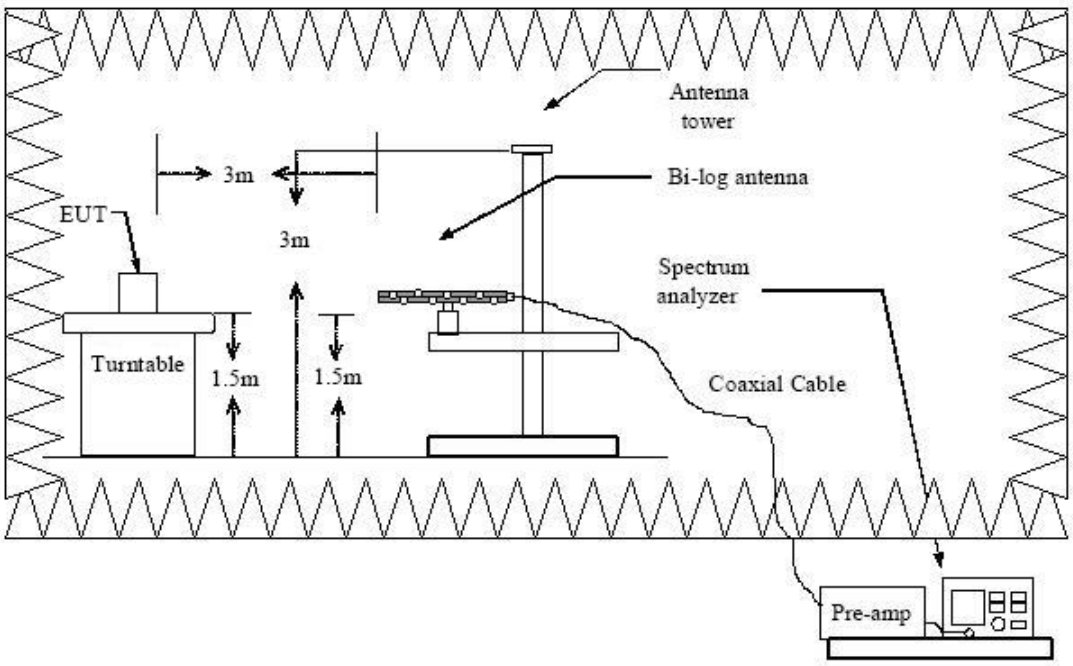
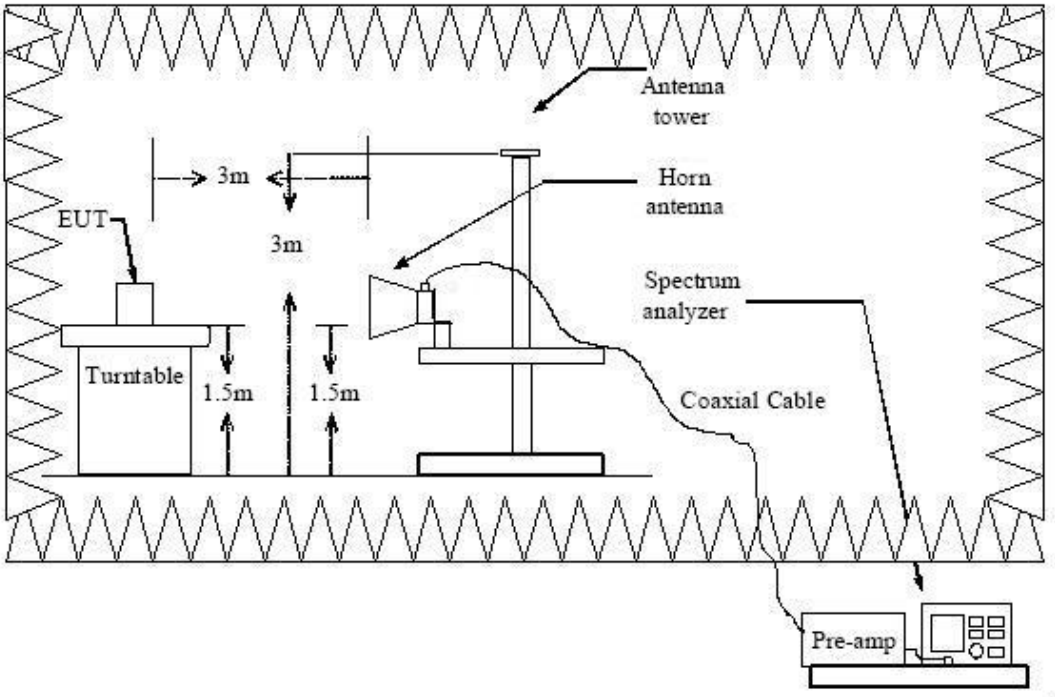
The diagram below shows the test setup that is utilized to make the measurements for emission below 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.7.1 for the test conditions.
2. Please refer to ETSI EN 301 893 (V1.5.1) clause 5.3.7.2 for the measurement method.

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TEST RESULTS

Below 1GHz

After we verified, the IEEE 802.11n HT20 mode of channel Low is worse case.

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/12/29
Test Mode	IEEE 802.11n HT20 RX / CH Low	Temp. & Humidity	21.9°C, 58%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
111.32	50.23	H	-62.95	-57.00	-5.95	-4.03
250.00	36.02	H	-76.13	-57.00	-19.13	-3.00
312.44	38.99	H	-71.50	-57.00	-14.50	-1.34
468.77	42.28	H	-64.23	-57.00	-7.23	2.64
500.00	41.40	H	-64.88	-57.00	-7.88	2.87
937.51	33.68	H	-64.64	-57.00	-7.64	10.83
49.37	56.99	V	-60.80	-57.00	-3.80	-8.64
110.55	51.46	V	-58.23	-57.00	-1.23	-0.54
249.98	40.92	V	-69.23	-57.00	-12.23	-1.00
371.24	38.94	V	-68.81	-57.00	-11.81	1.40
499.99	36.94	V	-66.62	-57.00	-9.62	5.59
937.50	31.24	V	-64.00	-57.00	-7.00	13.91

Remark:

1. *The emission behaviour belongs to narrowband spurious emission*
2. *According to technical experiences, all spurious emissions at all channels are almost the same below 1GHz, so that the channel low was chosen as representative for the test.*

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Above 1GHz

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	RX / CH Low	Temp. & Humidity	20.9°C, 56%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
1250.01	48.92	H	-63.91	-47.00	-16.91	-3.68
1597.80	46.39	H	-64.38	-47.00	-17.38	-1.62
1250.00	46.92	V	-66.26	-47.00	-19.26	-4.03
10360.01	42.46	V	-50.80	-47.00	-3.80	15.89

Product Name	Smart 300N Broadband Router	Test By	John Chen
Model	BR485d	Test Date	2011/11/29
Test Mode	RX / CH High	Temp. & Humidity	20.9°C, 56%

Frequency (MHz)	Reading (dBμV)	Antenna Polarization (V/H)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Correction Factor (dB)
1250.00	44.28	H	-68.55	-47.00	-21.55	-3.68
10480.02	42.16	H	-50.20	-47.00	-3.20	16.79
1250.00	46.95	V	-66.23	-47.00	-19.23	-4.03
10480.00	42.67	V	-50.14	-47.00	-3.14	16.34

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

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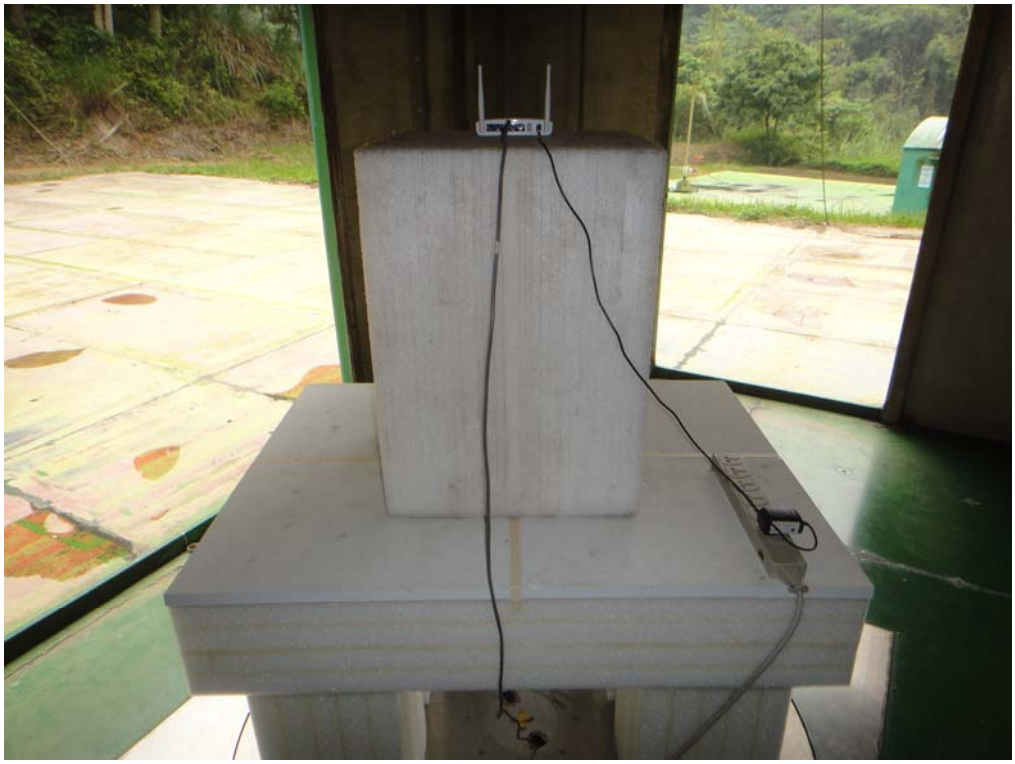
APPENDIX SETUP PHOTOS



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EN 62311: 2008

TEST REPORT

For

Smart 300N Broadband Router

Model: BR485d

Trade Name: E-TOP

Issued to

E-Top Network Technology Inc.
No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
Tainan Lab.
No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
TEL: 886-6-580-2201
FAX: 886-6-580-2202

Issued Date: February 08, 2012

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	February 08, 2012	Initial Issue	ALL	Sunny Chang

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APPENDIX 1 - PHOTOGRAPHS OF EUT A1

1. TEST RESULT CERTIE-TOPATION

Applicant: E-Top Network Technology Inc.
No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.

Manufacture E-Top Network Technology Inc.
No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan, R.O.C.

Equipment Under Test: Smart 300N Broadband Router

Trade Name: E-TOP

Model: BR485d

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
EN 62311: 2008	No non-compliance noted

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in EN 62311. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Jeter Wu
Assistant Manager

Reviewed by:

Eric Huang
Assistant Section Manager

2. EUT DESCRIPTION

Product	Smart 300N Broadband Router
Trade Name	E-TOP
Model Number	BR485d
Received Date	November 28, 2011
Module Trade Name	Realtek
Module Model Number	RTL8192DE
Frequency Range	IEEE 802.11b/g ,802.11n HT20 : 2412MHz ~ 2472MHz IEEE 802.11n HT40 : 2422MHz ~ 2462MHz IEEE 802.11a, 802.11n HT20 : 5180MHz ~ 5240MHz IEEE 802.11n HT40 : 5190MHz ~ 5230MH z
Transmit Power	IEEE 802.11b : 18.71 dBm IEEE 802.11g : 18.34 dBm IEEE 802.11n HT20 : 18.23 dBm IEEE 802.11n HT40 : 18.40 dBm IEEE 802.11a : 11.64 dBm IEEE 802.11n HT20 : 12.28 dBm IEEE 802.11n HT40 : 11.03 dBm
Modulation Technique	IEEE 802.11b：DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g：OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40：OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	IEEE 802.11b/g, 802.11n HT20 :13 Channels IEEE 802.11n HT40 : 9 Channels IEEE 802.11a, 802.11n HT20 : 4 Channels IEEE 802.11HT40 : 3 Channels
Channels Spacing	IEEE 802.11b/g, 802.11n HT20/HT40 : 5MHz IEEE 802.11n HT40 : 20MHz IEEE 802.11a, 802.11n HT20 : 20MHz IEEE 802.11n HT40 : 20MHz
Antenna Specification	**Two antennas (2TX2RX)** Manufacture: YONG-SHUN TECH. CO., LTD. Type: Co-linear dipole structure Model: AN-152RRSU00 Gain: 3dBi for 2.4GHz, 4dBi for 5GHz Connector: Reverse SMA PLUG
Antenna Designation	Dipole Antenna (2T2R)
Power Source	**Powered from adapter** Model: JKY36-SP1201000 Input: 100-240Vac, 50/60Hz, 0.5A Output: 12Vdc, 1000mA
Temperature Range	0°C ~ +40°C

Note:

1. Client consigns one model sample to test (Model Number: BR485d).Therefore, the testing Lab. just guarantees the unit, which has been tested.
2. To add a series model is for business necessary. The different of the each model is shown as bellows:

Multiple listing:

Company Name/Address	Brand name	Model	Product Name
E-Top Network Technology Inc. No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.	E-TOP	BR485d	Smart 300N Broadband Router
Sapido Technology Inc. No. 383., Sec. 2, Minsheng Rd., West Central District, Tainan 700, Taiwan, R.O.C.	SAPIDO	RB-1830	Smart 300Mbps Dualband Router - All Broadbands

I/O PORT

I/O PORT TYPES	*Q'TY*	TESTED WITH
N/A	---	---

3. FACILITIES AND ACCREDITATIONS

3.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☐ No. 199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☐ No. 11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

☒ No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
Tel: 886-6-580-2201 / Fax: 886-6-580-2202

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

3.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

3.3 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Germany	TUV NORD
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

4. EN 62311 REQUIREMENT

4.1 HUMAN EXPOSURE TO THE ELECTROMAGNETIC FIELDS

LIMIT

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the following limits.

TEST RESULTS

No non-compliance noted

Since average output power at worst case is

IEEE 802.11b	**:**	**18.74**	**dBm**	**0.0748**	**W**
IEEE 802.11g	**:**	**18.34**	**dBm**	**0.0682**	**W**
IEEE 802.11n HT20	**:**	**18.23**	**dBm**	**0.0665**	**W**
IEEE 802.11n HT40	**:**	**18.40**	**dBm**	**0.0692**	**W**
IEEE 802.11a	**:**	**11.64**	**dBm**	**0.0146**	**W**
IEEE 802.11n HT20	**:**	**12.28**	**dBm**	**0.0169**	**W**
IEEE 802.11n HT20	**:**	**11.03**	**dBm**	**0.0127**	**W**

which higher than 0.02W, which is the exempt condition as specified in EN 62311. Therefore a exposure evaluation at a safety distance of 20 cm has been performed (according to EN 62311 Section 8) and the resulting electrical field strength E proves that this device will not generate the harmful EM emission above the reference level as specified in EC Council Recommendation (1999/519/EC).

4.2 HUMAN EXPOSURE ASSESSMENT

EUT parameter (data from the separate report)						
Max average output power in Watt (TP)	IEEE 802.11b	:	18.74	dBm	0.0748	W
	IEEE 802.11g	:	18.34	dBm	0.0682	W
	IEEE 802.11n HT20	:	18.23	dBm	0.0665	W
	IEEE 802.11n HT40	:	18.40	dBm	0.0692	W
Antenna gain (2.4G)	IEEE 802.11b/g/n HT20/n HT40: 3 dBi (Numeric gain: 2)					
Safety distance (m)	0.2 m (20cm)					

Exposure evaluation

Given

$$E = \frac{\sqrt{30 \times G \times TP}}{D}$$

$$D = \frac{\sqrt{30 \times G \times TP}}{E}$$

Where
G: numerical gain of transmitting antenna;
TP: Transmitted power in watt;
D: distance from the transmitting antenna in meter

IEEE 802.11b:
Yield

√	G	TP(W)	D(m)	E(V/m)
30	2.00	0.0748	0.2	10.59387

IEEE 802.11g:
Yield

√	G	TP(W)	D(m)	E(V/m)
30	2.00	0.0682	0.2	10.11657

IEEE 802.11n HT20:
Yield

√	G	TP(W)	D(m)	E(V/m)
30	2.00	0.0665	0.2	9.98974

IEEE 802.11n HT40:
Yield

√	G	TP(W)	D(m)	E(V/m)
30	2.51	0.0692	0.2	11.41190

EUT parameter (data from the separate report)						
Max average output power in Watt (TP)	IEEE 802.11a	:	19.10	dBm	0.0813	W
	IEEE 802.11n HT20	:	18.13	dBm	0.065	W
	IEEE 802.11n HT40	:	17.65	dBm	0.0582	W
Antenna gain (5G)	IEEE 802.11a/n HT20/n HT40: 4 dBi (Numeric gain: 2.51)					
Safety distance (m)	0.2 m (20cm)					

Exposure evaluation

Given

$$E = \frac{\sqrt{30 \times G \times TP}}{D}$$

$$D = \frac{\sqrt{30 \times G \times TP}}{E}$$

Where
G: numerical gain of transmitting antenna;
TP: Transmitted power in watt;
D: distance from the transmitting antenna in meter

IEEE 802.11a:
Yield

√	G	TP(W)	D(m)	E(V/m)
30	2.51	0.0146	0.2	5.24077

IEEE 802.11n HT20:
Yield

√	G	TP(W)	D(m)	E(V/m)
30	2.51	0.0169	0.2	5.64041

IEEE 802.11n HT40:
Yield

√	G	TP(W)	D(m)	E(V/m)
30	2.51	0.0127	0.2	4.88570

Conclusion:
→ E= 11.41 V/m is the maximum E-Field strength when safety distance between the EUT and human body is maintained at least 20cm, which is below 61V/m as required in Annex III table 2 of EC Council Recommendation (1999/519/EC). This proves that the unit complies with the EN 62311 for RF exposure requirement.

TEST REPORT

IEC / EN 60950-1

Information Technology Equipment – Safety – Part 1:General requirements

Report reference No……:	T11112830801-LV
Date of Issue…… .:	Mar., 01, 2012
Total number of pages……..…:	72
Testing laboratory ……:	Compliance Certification Services Inc.
Location……..:	No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
Test Place……..:	6 F,No.605,Zhongshan Rd.,Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
Applicant……:	E-Top Network Technology Inc.
Address:……..:	No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan,R.O.C.
Standards……:	EN 60950-1:2006+A11:2009+A1:2010+A12:2011 IEC 60950-1:2005+A1:2009
Procedure deviation……..:	N/A
Non-standard test method……:	N/A
Type of test equipment ……:	1) Smart 300N Broadband Router 2) Smart 300Mbps Dualband Router - All Broadbands
Trade mark……..:	1) ETOP ; 2) SAPIDO
Model/Type designation……:	1) BR485d ; 2) RB-1830
Multiple Listing ……:	See page 3.
Manufacturer……:	E-Top Network Technology Inc.
Address:……..:	No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan,R.O.C.
Rating……:	I/P : 12Vdc, 1.0A
Copyright TRF……..:	This test report is based on a blank TRF(IEC60950_1C) that was prepared by Fimko. The copyright of blank test report is belong to the CCB body of SGS.

Declaration:

CCS represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (NML) of R.O.C., or National Institute of Standards and Technology (NIST) of U.S.A.

CCS's reports apply only to the specific samples tested under conditions. It is manufacture's res-ponsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components.CCS shall have no liability for any declarations, inferences or generalizations drawn by the client or others from CCS issued reports.

CCS's reports must not be used by the client to claim product endorsement by the authorities or any agency of the Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and CCS-self, extracts from the test report shall not be reproduced except in full with CCS's authorized written approval.

Tested by: Eason Chiang **Eason Chiang**	Reviewed by: Amber Liao **Amber Liao**

Test item particulars:	
Equipment mobility	Movable
Connection to the mains…..	Not directly connected to the mains
Operating Condition..……	Continuous
Overvoltage category (OCV)……	Other : no connection to the mains.
Access location ……	Operator accessible
Mains supply tolerance (%)……	--
Tested for IT power systems……..	NO
IT testing, phase-phase voltage (V)……..	N/A
Class of equipment……	Class III
Altitude during operation (m)……..	Up to 2000
Pollution degree (PD)……...	PD 2
Protection against ingress of water……	IPX0
Considered current rating (A)……..……	--
Mass of equipment.(Kg)……..	Approx. 0.20 Kg
Testing :	
Date of receipt of test item	Dec., 2011
Date(s) of performance of tests	Dec., 2011 to Mar., 2012
Possible test case verdicts:	
-Test case does not apply to the test object.	N(.A.)
-Test object does meet the requirement.	P(ass)
-Test object does not meet the requirement.	F(ail)
General Remarks:	
The test results presented in this report relate only to the object tested.	
This report shall not be reproduced, except in full, without the written approval of the testing laboratory.	
"(see Enclosure #) refers to additional information appended to the report.	
“(see appended table)” refers to a table appended to the report.	
This report shall not be reproduced except in full without the written approval of the testing laboratory.	
Factory : 1. E-Top Network Technology Inc. No. 82 ,Gongye 2nd Rd.,Tainan City 70955,Taiwan,R.O.C.	

1	Report		Page 1-60
2	Attachment - A.	EUT Photos	Page 61-66
3	Attachment - B.	Product ID Label	Page 67-68
4	Attachment - C.	Schematics and Layout	Page 69
5	Attachment - D.	Users Instruction	Page 70
6	Attachment - E.	Measuring Instrument List	Page 71-72

Comments:
Sample Number: Test sample(s) without serial number(s).

General product information :

1. The equipment is a movable for general use in information technology equipment.
2. All models are identical except product name, model designation and trade-mark for marketing purpose.
3. The external power adapters are approved products which were evaluated according to EN 60950-1, for detail information see appended table 1.5.1.
4. The equipment's top enclosure is secured to bottom enclosure by snap-shelf.
5. The equipment is incorporated with following critical parts :
   1) Plastic enclosure.
   2) Main board detail as below :
      - 5 x RJ-45 port.
      - 1 x USB port.

Engineering Considerations :

1. The product was submitted and tested for use at the maximum ambient temperature(Tma) permitted by the manufacturer's specification of : +40℃。
2. Unless otherwise specified the tests were performed on model : BR485d.
3. The load conditions used during testing :
   - All connectors connected and transmit data continuously and USB port connector with a dummy load of 2.5W to represent the USB load.
4. The external power adapter was in compliance with Limited Power Sources requirements. See appended table 1.5.1 for detail.
5. The maximum ambient temperature of external power adapter is +25℃. However, the power adapter additional requirement test and evaluated under +40℃ ambient had been considered with this equipment.
6. The product is in compliance with the requirements of IEC/EN 60950-1.
7. All output data ports have been evaluated complying with Limited Power Source.

Multiple Listing :

Company Name	Address	Brand name	Product Name	Model name
E-Top Network Technology Inc.	No. 82 ,Gongye 2nd Rd.,Tainan City 70955, Taiwan,R.O.C.	ETOP	Smart 300N Broadband Router	BR485d
Sapido Technology Inc.	No. 383., Sec. 2, Minsheng Rd., West Central District, Tainan 700, Taiwan, R.O.C.	SAPIDO	Smart 300Mbps Dualband Router - All Broadbands	RB-1830

Report revise record:					
No.	Issue Date	Report Number	Rev.	Revisions	Effect Page
00	2012-03-01	T11112830801-LV	00	Original report	N/A

IEC/EN 60950-1			
Clause	Requirement - Test	Result - Remark	Verdict
1	**General**		**P**
1.5	**Components**		**P**
1.5.1	General		**P**
	Comply with IEC 60950 or relevant component standard	Components that were found to affect safety aspects comply with the requirements of this standard or with the safety aspects of the relevant IEC component standards. (see appended table 1.5.1)	**P**
1.5.2	Evaluation and testing components	Components that were certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	**P**
1.5.3	Thermal controls	No thermal controls.	**N**
1.5.4	Transformers	Class III equipment.	**N**
1.5.5	Interconnecting cables	Interconnection cable for signal output to other device is carrying only SELV on an energy level below 240VA. Except for the insulation material, there are no further requirements for the o/p interconnection cable.	**P**
1.5.6	Capacitors bridging insulation	Not direct connect to the mains supply.	**N**
1.5.7	Resistors bridging insulation	Not direct connect to the mains supply.	**N**
1.5.7.1	Resistors bridging functional, basic or supplementary insulation		**N**
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits		**N**
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		**N**
1.5.8	Components in equipment for IT power systems	Class III equipment.	**N**
1.5.9	Surge suppressors	No such parts.	**N**
1.5.9.1	General		**N**
1.5.9.2	Protection of VDRs		**N**
1.5.9.3	Bridging of functional insulation by a VDR		**N**
1.5.9.4	Bridging of basic insulation by a VDR		**N**
1.5.9.5	Bridging of Supplementary, double or reinforced insulation by a VDR		**N**
1.6	Power interface		**P**
1.6.1	AC power distribution systems	Not direct connect to the mains supply.	**N**
1.6.2	Input current	(see appended table 1.6.2)	**P**
1.6.3	Voltage limit of hand-held equipment	Not hand-held equipment.	**N**
1.6.4	Neutral conductor	Class III equipment	**N**

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Clause	Requirement - Test	Result - Remark	Verdict
1.7	Marking and instructions		**P**
1.7.1	Power rating and identification markings	See below	**P**
1.7.1.1	Power rating markings		**P**
	Multiple mains supply connections	Not connect to the mains supply.	**N**
	Rated voltage(s) or voltage range(s) (V)	Optional, (not connect to the mains supply)	**P**
	Symbol for nature of supply for d.c. only.	Optional, IEC 60417, Symbol No. 5031 used. (not connect to the mains supply)	**N**
	Rated frequency or rated frequency range (Hz)	(not connect to the mains supply)	**N**
	Rated current (mA or A)	Optional, (not connect to the mains supply).	**P**
1.7.1.2	Identification markings	See below.	**P**
	Manufacturer's name or Trade-mark or identification mark	Trade-mark : ETOP、SAPIDO	**P**
	Model identification or type reference	BR485d、RB-1830	**P**
	Symbol for Class II equipment only	Class III equipment.	**N**
	Other markings and symbols	Additional symbols or markings do not cause misunderstanding.	**P**
	Certification marks	CE marking.	**P**
1.7.2	Safety instructions and marking	See below.	**P**
1.7.2.1	General	The user's manual contains information for operation, installation and technical.	**P**
1.7.2.2	Disconnect devices	Class III equipment.	**N**
1.7.2.3	Overcurrent protective device	No such part.	**N**
1.7.2.4	IT power distribution system	Class III equipment.	**N**
1.7.2.5	Operator access with a tool	No operator access with a tool.	**N**
1.7.2.6	Ozone	No such part.	**N**
1.7.3	Short duty cycles	Unit is designed for continuous operation.	**N**
1.7.4	Supply voltage adjustment	Class III equipment.	**N**
	Methods and means of adjustment；reference to installation instructions		**N**
1.7.5	Power outlets on the equipment	No outlet.	**N**
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)		**N**
1.7.7	Wiring terminals	See below	**N**
1.7.7.1	Protective earthing and bonding terminals	Class III equipment.	**N**
1.7.7.2	Terminal for a.c. mains supply conductors	Class III equipment.	**N**
1.7.7.3	Terminal for d.c. mains supply conductors	Class III equipment.	**N**
1.7.8	Controls and indicators	See below	**P**
1.7.8.1	Identification, location and marking	The marking and identification of the power switch is located that indication of function is clearly.	**P**
1.7.8.2	Colours	No safety involved controls or indicators. However LED indicators are used to indicated the working mode of the equipment	**N**

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Clause	Requirement - Test	Result - Remark	Verdict
1.7.8.3	Symbols according to IEC 60417		**N**
1.7.8.4	Markings using figures	No figures used.	**N**
1.7.9	Isolation of multiple power sources	Class III equipment.	**N**
1.7.10	Thermostats and other regulating devices	No thermostats or other regulating devices.	**N**
1.7.11	Durability	The label was subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15s and then again for 15s with the cloth soaked with petroleum spirit. After this test there was no damage to the label. The marking on the label did not fade. There was no curling nor lifting of the label edge.	**P**
1.7.12	Removable parts	No removable parts.	**N**
1.7.13	Replaceable batteries	No battery.	**N**
	Language(s)		—
1.7.14	Equipment for restricted access locations	No restricted access locations.	**N**
2	**Protection from hazards**		**P**
2.1	Protection from electric shock and energy hazards		**P**
2.1.1	Protection in operator access areas	See below.	**P**
2.1.1.1	Access to energized parts	The system is supplied from an approved external power adapter that provides only SELV and I/O ports energy level below 240VA.	**P**
	Test by inspection	The test finger and test pin unable to contact bare hazardous parts, basic insulation or ELV circuits.	**P**
	Test with test finger(Figure 2A)	Ditto	**P**
	Test with test pin(Figure 2B)	No hazards.	**P**
	Test with test probe(Figure 2C)	No TNV.	**N**
2.1.1.2	Battery compartments		**N**
2.1.1.3	Access to ELV wiring	No ELV wiring in operator accessible area.	**N**
	Working voltage (Vpeak or Vrms); minimum distance through insulation(mm)		**N**
2.1.1.4	Access to hazardous voltage circuit wiring	No hazardous voltage wiring in operator accessible area.	**N**
2.1.1.5	Energy hazards	No energy hazards in equipment.	**N**
2.1.1.6	Manual controls	No manual controls.	**N**
2.1.1.7	Discharge of capacitors in equipment	Class III equipment.	**N**
	Measured voltage(V)；time-constant(s)		**N**
2.1.1.8	Energy hazard-d.c. mains supply	Not connect to the mains supply.	**N**
	a) Capacitor connected to the d.c. mains supply		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
	b) Internal battery connected to the d.c. mains supply		**N**
2.1.1.9	Audio amplifiers	No such parts.	**N**
2.1.2	Protection in service access areas	No maintenance work in operation mode necessary.	**N**
2.1.3	Protection in restricted access locations	The unit is not intended to be used in restricted locations.	**N**
2.2	SELV circuits		**P**
2.2.1	General requirements	See below.	**P**
2.2.2	Voltage under normal conditions (V)	Approved external power adapter used. Hence all other parts are supplied by SELV only and not carrying voltages exceeding the SELV limits.	**P**
2.2.3	Voltage under fault conditions (V)	See above.	**P**
2.2.4	Connection of SELV circuits to other circuits	See 2.2.2 and 2.2.3. No direct connection between SELV and any primary circuits.	**P**
2.3	TNV circuits		**N**
2.3.1	Limits	No TNV circuits.	**N**
	Type of TNV circuit		**N**
2.3.2	Separation from other circuits and from accessible parts		**N**
2.3.2.1	General requirements		**N**
2.3.2.2	Protection by basic insulation		**N**
2.3.2.3	Protection by earthing		**N**
2.3.2.4	Protection by other constructions		**N**
2.3.3	Separation from hazardous voltages		**N**
	Insulation employed		—
2.3.4	Connection of TNV circuits to other circuits		**N**
	Insulation employed		—
2.3.5	Test for operating voltages generated externally		**N**
2.4	Limited current circuits		**N**
2.4.1	General requirements		**N**
2.4.2	Limit values		**N**
	Frequency (Hz)		**--**
	Measured current (mA)		**--**
	Measured voltage (V)		**--**
	Measured circuit capacitance (nF or μF)		**--**
2.4.3	Connection of limited current circuits to other circuits		**N**
2.5	Limited power source		**P**
	a) Inherently limited output		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
	b) Impedance limited output	(see appended table 2.5)	**P**
	c) Regulating network limited output under normal operating and single fault condition	(see appended table 2.5)	**P**
	d) Overcurrent protective device limited output		**N**
	Max. output voltage (V), max. output current (A), max. apparent power (VA)	(see appended table 2.5)	**P**
	Current rating of overcurrent protective device (A)	No overcurrent protective device.	**N**
	Use of integrated circuit (IC) current limiters	No such parts.	**N**
2.6	Provisions for earthing and bonding		**N**
2.6.1	Protective earthing	Class III equipment.	**N**
2.6.2	Functional earthing		**N**
2.6.3	Protective earthing and protective bonding conductors		**N**
2.6.3.1	General		**N**
2.6.3.2	Size of protective earthing conductors		**N**
	Rated current (A), cross-sectional area (mm^2), AWG		—
2.6.3.3	Size of protective bonding conductors		**N**
	Rated current (A), cross-sectional area (mm^2), AWG		—
2.6.3.4	Resistance of earthing conductors and their terminations, resistance (Ω), voltage drop (V), test current (A), duration (min)		**N**
2.6.3.5	Colour of insulation		**N**
2.6.4	Terminals		**N**
2.6.4.1	General		**N**
2.6.4.2	Protective earthing and bonding terminals		**N**
	Rated current (A), type nominal thread diameter (mm)		—
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		**N**
2.6.5	Integrity of protective earthing		**N**
2.6.5.1	Interconnection of equipment		**N**
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		**N**
2.6.5.3	Disconnection of protective earth		**N**
2.6.5.4	Parts that can be removed by an operator		**N**
2.6.5.5	Parts removed during servicing		**N**
2.6.5.6	Corrosion resistance		**N**
2.6.5.7	Screws for protective bonding		**N**
2.6.5.8	Reliance on telecommunication network or cable distribution system	No telecommunication network.	**N**

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Clause	Requirement - Test	Result - Remark	Verdict
2.7	Overcurrent and earth fault protection in primary circuits		**N**
2.7.1	Basic requirements	Class III equipment.	**N**
	Instruction when protection relies on building installation		**N**
2.7.2	Faults not simulated in 5.3.7		**N**
2.7.3	Short-circuit backup protection		**N**
2.7.4	Number and location of protective devices		**N**
2.7.5	Protection by several devices		**N**
2.7.6	Warning to service personnel		**N**
2.8	Safety interlocks		**N**
2.8.1	General principles	No safety interlocks.	**N**
2.8.2	Protection requirements		**N**
2.8.3	Inadvertent reactivation		**N**
2.8.4	Fail-safe operation		**N**
2.8.5	moving parts		**N**
2.8.6	Overriding		**N**
2.8.7	Switches, relays and their related circuits		**N**
2.8.7.1	Separation distances for contact gaps and their related circuits (mm)		**N**
2.8.7.2	Overload test		**N**
2.8.7.3	Endurance test		**N**
2.8.7.4	Electric strength test		**N**
2.8.8	Mechanical actuators		**N**
2.9	Electrical insulation		**P**
2.9.1	Properties of insulating materials	Natural rubber, asbestos or hygroscopic materials are not used.	**P**
2.9.2	Humidity conditioning	Class III equipment.	**N**
	Relative humidity (%), temperature (℃)		—
2.9.3	Grade of insulation	Insulation materials comply with relevant requirements.	**P**
2.9.4	Separation from hazardous voltage	Class III equipment.	**N**
	Method (s) used		—
2.10	Clearance, creepage distances and distances through insulation *Only SELV circuit inside the unit and no TNV circuit. (See also sub clause 5.3.4)*		**N**
2.10.1	General		**N**
2.10.1.1	Frequency		**N**
2.10.1.2	Pollution degrees		**N**
2.10.1.3	Reduced values for functional insulation		**N**
2.10.1.4	Intervening unconnected conductive parts		**N**
2.10.1.5	Insulation with varying dimensions		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
2.10.1.6	Special separation requirements		**N**
2.10.1.7	Insulation in circuits generating Starting pulses		**N**
2.10.2	Determination of working voltage		**N**
2.10.2.1	General		**N**
2.10.2.2	RMS working voltage		**N**
2.10.2.3	Peak working voltage		**N**
2.10.3	Clearances		**N**
2.10.3.1	General		**N**
2.10.3.2	Main Transient voltage		**N**
	a)AC mains supply		**N**
	b)Earthed d.c. mains supplies		**N**
	c)Unearthed d.c. mains supply		**N**
	d)Battery operation		**N**
2.10.3.3	Clearance in primary circuits		**N**
2.10.3.4	Clearance in secondary circuits		**N**
2.10.3.5	Clearance in circuits having starting pulses		**N**
2.10.3.6	Transients from a.c. mains supply		**N**
2.10.3.7	Transients from d.c. mains supply		**N**
2.10.3.8	Transients from telecommunication networks and cable distribution systems		**N**
2.10.3.9	Measurement of transient voltage levels		**N**
	a)Transients from a mains supply		**N**
	For an a.c. mains supply		**N**
	For a d.c. mains supply		**N**
	b)Transients from a telecommunication network		**N**
2.10.4	Creepage distance		**N**
2.10.4.1	General		**N**
2.10.4.2	Material group and caomparative tracking index		**N**
	CTI tests		**N**
2.10.4.3	Minimum creepage distances		**N**
2.10.5	Solid insulation		**N**
2.10.5.1	General		**N**
2.10.5.2	Distances through insulation		**N**
2.10.5.3	Insulating compound as solid insulation		**N**
2.10.5.4	Semiconductor devices		**N**
2.10.5.5	Cemented joints		**N**
2.10.5.6	Thin sheet material-General		**N**
2.10.5.7	Separable thin sheet material		**N**
	Number of layers (pcs)		**N**
2.10.5.8	Non-separable thin sheet material		**N**
2.10.5.9	Thin sheet material-standard test procedure		**N**
	Electric strength test		**N**
2.10.5.10	Thin sheet material-alternative test procedure		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
	Electric strength test		**N**
2.10.5.11	Insulation in wound components		**N**
2.10.5.12	Wire in wound components		**N**
	Working voltage		**N**
	a)basic insulation not under stress		**N**
	b)basic supplementary, reinforced insulation		**N**
	c)Compliance with Annex U		**N**
	Tow wires in contact inside wound component；angle between 45° and 90°		**N**
2.10.5.13	Wire with solvent-based enamel in wound components		**N**
	Electric strength test		**N**
	Routine test		**N**
2.10.5.14	Additional insulation in wound components		**N**
	Working voltage		**N**
	-basic insulation not under stress		**N**
	-supplementary, reinforced insulation		**N**
2.10.6	Construction of printed boards		**N**
2.10.6.1	Uncoated printed boards		**N**
2.10.6.2	Coated printed boards		**N**
2.10.6.3	Insulation between conductors on the same inner surface of a printed board		**N**
2.10.6.4	Insulation between conductors on different layers of a printed board		**N**
	Distance through insulation		**N**
	Number of insulation layers (pcs)		**N**
2.10.7	Component external terminations		**N**
2.10.8	Test on coated printed boards and coated components		**N**
2.10.8.1	Sample preparation and preliminary inspection		**N**
2.10.8.2	Thermal conditioning		**N**
2.10.8.3	Electric strength test		**N**
2.10.8.4	Abrasion resistance test		**N**
2.10.9	Thermal cycling		**N**
2.10.10	Test for Pollution Degree 1 environment and insulation compound		**N**
2.10.11	Test for semiconductor devices and cemented joints		**N**
2.10.12	Enclosed and sealed parts		**N**
3	**WIRING, CONNECTIONS AND SUPPLY**		**P**
3.1	General		**P**

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Clause	Requirement - Test	Result - Remark	Verdict
3.1.1	Current rating and overcurrent protection	All internal wires are UL recognized wiring which is PVC insulated, rated VW-1, min. 80°C. Internal wiring is PVC insulated, the wiring gauge is suitable for current intended to be carried.	**P**
3.1.2	Protection against mechanical damage	Class III equipment.	**N**
3.1.3	Securing of internal wiring	Class III equipment.	**N**
3.1.4	Insulation of conductors	Class III equipment.	**N**
3.1.5	Beads and ceramic insulators	Not used.	**N**
3.1.6	Screws for electrical contact pressure	No such screws used.	**N**
3.1.7	Insulation materials in electrical connections	No contact pressure through insulating material.	**P**
3.1.8	Self-tapping and spaced thread screws	No self-tapping or spaced thread screw.	**P**
3.1.9	Termination of conductors	Class III equipment.	**N**
	10N pull test		**N**
3.1.10	Sleeving on wiring	No sleeving used.	**N**
3.2	Connection to a main supply *Class III equipment, not connect to the mains supply.*		**N**
3.2.1	Means of connection		**N**
3.2.1.1	Connection to an a.c. mains supply		**N**
3.2.1.2	Connection to a d.c. mains supply		**N**
3.2.2	Multiple supply connections		**N**
3.2.3	Permanently connected equipment		**N**
	Number of conductors, diameter (mm) of cable and conduits		—
3.2.4	Appliance inlets		**N**
3.2.5	Power supply cords		**N**
3.2.5.1	AC Power supply cords		**N**
	Type		—
	Rated current (A), cross-sectional area (mm^2), AWG		—
3.2.5.2	DC Power supply cords		**N**
3.2.6	Cord anchorages and strain relief		**N**
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
3.2.7	Protection against mechanical damage		**N**
3.2.8	Cord guards		**N**
	Diameter or minor dimension D (mm); test mass (g)		—
	Radius of curvature of cord (mm)		—
3.2.9	Supply wiring space		**N**
3.3	Wiring terminals for connection of external conductors *Class III equipment.*		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
3.3.1	Wiring terminals		**N**
3.3.2	Connection of non-detachable power supply cords		**N**
3.3.3	Screw terminals		**N**
3.3.4	Conductor sizes to be connected		**N**
	Rated current (A), type and nominal thread diameter (mm)		**N**
3.3.5	Wiring terminal sizes		**N**
	Rated current (A), type and nominal thread diameter (mm)		**N**
3.3.6	Wiring terminals design		**N**
3.3.7	Grouping of wiring terminals		**N**
3.3.8	Standard wire		**N**
3.4	Disconnection from the mains supply *Class III equipment, not connect to the mains supply.*		**N**
3.4.1	General requirement		**N**
3.4.2	Disconnect devices		**N**
3.4.3	Permanently connected equipment		**N**
3.4.4	Parts which remain energized		**N**
3.4.5	Switches in flexible cords		**N**
3.4.6	Single-phase equipment		**N**
3.4.7	Three-phase equipment		**N**
3.4.8	Switches as disconnect devices		**N**
3.4.9	Plugs as disconnect devices		**N**
3.4.10	Interconnected equipment		**N**
3.4.11	Multiple power source		**N**
3.5	Interconnection of equipment		**P**
3.5.1	General requirements	See below.	**P**
3.5.2	Types of interconnection circuits	SELV circuit.	**P**
3.5.3	ELV circuits as interconnection circuits	No ELV interconnections.	**N**
3.5.4	Data ports for additional equipment	(see appended table 2.5)	**P**
4	**Physical requirements**		**P**
4.1	Stability	See below	**N**
	Mass of the equipment exceeding 7 kg…….:	Mass of equipment: 0.21 kg	**N**
	Angle of 10°		**N**
	Test force (N)	Equipment is not a floorstanding unit.	**N**
4.2	Mechanical strength		**P**
4.2.1	General	See below.	**P**
4.2.2	Steady force test, 10N	Class III equipment.	**N**

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Clause	Requirement - Test	Result - Remark	Verdict
4.2.3	Steady force test, 30N		**N**
4.2.4	Steady force test, 250N	Class III equipment.	**N**
4.2.5	Impact test	Class III equipment.	**N**
	Fall test		**N**
	Swing test		**N**
4.2.6	Drop test	Movable equipment.	**N**
4.2.7	Stress relief	Class III equipment.	**N**
4.2.8	Cathode ray tubes	No cathode ray tubes	**--**
	Picture tube separately certified		**N**
	Picture tubes > 16 cm intrinsically protected		**N**
	Non-intrinsically protected tubes > 16 m used with protective screen		**N**
	Intrinsically protected tubes : tests on 12 samples		**N**
	Samples subject to ageing : 6		**N**
	Samples subject to implosion test : 6		**N**
	Samples subject to mechanical strength test (steel ball) : 6		**N**
	Non-intrinsically protected tubes tested		**N**
4.2.9	High pressure lamps	No high pressure lamp.	**N**
4.2.10	Wall or ceiling mounted equipment	The equipment and its associated mounting means shall remain secure during test. 0.20kg x 3=0.60kg (3 times weight of equipment)	**P**
	force (N)	50N/1min	**--**
4.2.11	Rotating solid media	No such device.	**N**
	Test to cover on the door		**--**
4.3	Design and construction		**P**
4.3.1	Edges and corners	All edges and corners judged to be sufficiently well rounded.	**P**
4.3.2	Handles and manual controls; force (N)	No such controls.	**N**
4.3.3	Adjustable controls	No adjustable controls.	**N**
4.3.4	Securing of parts	No loosening of parts impairing clearance or creepage distance is likely to occur.	**P**
4.3.5	Connection of plugs and sockets	IEC60083 and IEC60320 connectors are not used in equipment.	**N**
4.3.6	Direct plug-In equipment	No direct plug-In equipment.	**N**
	Torque		**N**
	Compliance with the relevant mains plug standard		**N**
4.3.7	Heating elements in earthed equipment	No heating elements.	**N**
4.3.8	Batteries	No battery.	**N**
	-Overcharging of a rechargeable battery		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
	-Unintentional charging of a non-rechargeable battery		**N**
	-Reverse charging of a rechargeable battery		**N**
	Excessive discharging rate for any battery		**N**
4.3.9	Oil and grease		**N**
4.3.10	Dust, powders, liquids and gases	Equipment in intended use not considered to be exposed to these.	**N**
4.3.11	Containers for liquids or gases	No container for liquid or gases.	**N**
4.3.12	Flammable liquids	No flammable liquids.	**N**
	Quantity of liquid (l)		**N**
	Flash point (℃)		**N**
4.3.13	Radiation; type of radiation		**P**
4.3.13.1	General	LED indicators.	**P**
4.3.13.2	Ionizing radiation		**N**
	Measured radiation (Pa/kg)		**N**
	Measured High-voltage (Kv)		**N**
	Measured focus voltage (Kv)		**N**
	CRT markings		**N**
4.3.13.3	Effect of ultraviolet (UV) radiation on materials		**N**
	Part, property, retention after test, flammability classification		**N**
4.3.13.4	Human exposure to ultraviolet (UV) radiation		**N**
4.3.13.5	Laser (including laser diodes) and LEDs	The LEDs are used as indicating lights and low power applications of LEDs.	**P**
4.3.13.5.1	Laser (including laser diodes)		**N**
	Laser class		**--**
4.3.13.5.2	Light emitting diodes (LEDs)	For indicator LEDs.	**P**
4.3.13.6	Other types		**N**
4.4	Protection against hazardous moving parts		**N**
4.4.1	General	No hazardous moving parts.	**N**
4.4.2	Protection in operator access areas		**N**
	Household and home/office document/media shredders		**--**
4.4.3	Protection in restricted access locations		**N**
4.4.4	Protection in service access areas		**N**
4.4.5	Protection against moving fan blades		**N**
4.4.5.1	General		**N**
	Not considered to cause pain or injury. a)		**N**
	Is considered to cause pain, not injury. b)		**N**
	Considered to cause injury. c)		**N**
4.4.5.2	Protection for users		**N**
	Use of symbol or warning		**N**
4.4.5.3	Protection for service persons		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
	Use of symbol or warning		**N**
4.5	Thermal requirements		**P**
4.5.1	General	See below	**P**
4.5.2	Temperature rise	(see appended table 4.5)	**P**
	Normal load condition per Annex L	Maximum normal load according to the operation manual.	**P**
4.5.3	Temperature limits for materials	(see appended table 4.5)	**P**
4.5.4	Touch temperature limits	(see appended table 4.5)	**P**
4.5.5	Resistance to abnormal heat	No such part.	**N**
4.6	Openings in enclosures		**N**
4.6.1	Top and side openings	No electrical and fire enclosure required.	**N**
	Dimensions (mm)		**--**
4.6.2	Bottom of fire enclosures	No electrical and fire enclosure required.	**N**
	Construction of the bottom, dimensions (mm)		**--**
4.6.3	Doors or covers in fire enclosures	No fire enclosure.	**N**
4.6.4	Openings in transportable equipment	Hand-held equipment.	**N**
4.6.4.1	Constructional design measures		**N**
	Dimensions(mm)		**N**
4.6.4.2	Evaluation measures for larger openings		**N**
4.6.4.3	Use of metalized parts		**N**
4.6.5	Adhesives for constructional purposes	No adhesives for constructional purpose.	**N**
	Conditioning temperature (℃),time (weeks)		**N**
4.7	Resistance to fire		**P**
4.7.1	Reducing the risk of ignition and spread of flame	See below.	**P**
	Method 1, selection and application of components wiring and materials	Use of materials with the required flammability classes.	**P**
	Method 2, application of all of simulated fault condition tests	Method 1 used.	**N**
4.7.2	Conditions for a fire enclosure	With having the following parts : -The EUT is supplied by limited power sources and components are mounted on PWB of flammability Class V-1. The fire enclosure is not required.	**P**
4.7.2.1	Parts requiring a fire enclosure	See clause 4.7.2	**N**
4.7.2.2	Parts no requiring a fire enclosure	See clause 4.7.2	**P**
4.7.3	Materials	See below.	**P**
4.7.3.1	General	PCB rated V-1 or better.	**P**
4.7.3.2	Materials for fire enclosures	See clause 4.7.2.	**N**
4.7.3.3	Materials for components and other parts outside fire enclosures	See sub-clause 4.7.2	**N**

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Clause	Requirement - Test	Result - Remark	Verdict
4.7.3.4	Materials for components and other parts inside fire enclosures.	Internal components except small parts are V-2 or better.	**P**
4.7.3.5	Materials for air filter assemblies	No air filter assemblies	**N**
4.7.3.6	Materials used in high-components	No high voltage components.	**N**
5	**ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS**		**P**
5.1	Touch current and protective conductor current *Class III equipment and no TNV circuit.*		**N**
5.1.1	General		**N**
5.1.2	Configuration of equipment under test (EUT)		**N**
5.1.2.1	Single connection to an a.c. mains supply		**N**
5.1.2.2	Redundant multiple connections to an a.c. mains supply		**N**
5.1.2.3	Simultaneous multiple connections to an a.c. mains supply		**N**
5.1.3	Test circuit		**N**
5.1.4	Application of measuring instrument		**N**
5.1.5	Test procedure		**N**
5.1.6	Test measurements		**N**
	Supply voltage (V)		**--**
	Measured touch current (mA)		**--**
	Max. allowed touch current (mA)		**--**
	Measured protective conductor current (mA)		**--**
	Max. allowed protective conductor current (mA)		**--**
5.1.7	Equipment with touch current exceeding 3.5 mA		**N**
5.1.7.1	General		**N**
5.1.7.2	Simultaneous multiple connections to the supply		**N**
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks		**N**
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		**N**
	Supply voltage (V)		**--**
	Measured touch current (mA)		**--**
	Max. allowed touch current (mA)		**--**
5.1.8.2	Summation of touch current from telecommunication networks		**N**
	a)EUT with earthed telecommunication ports		**--**
	b)EUT whose telecommunication ports have no reference to protective earth		**--**

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Clause	Requirement - Test	Result - Remark	Verdict
5.2	Electric strength *Class III equipment.*		**N**
5.2.1	General		**N**
5.2.2	Test procedure		**N**
5.3	Abnormal operating and fault conditions		**P**
5.3.1	Protection against overload and abnormal operation	Ventilation opening blocked. (see appended table 5.3)	**P**
5.3.2	Motors	No motors	**N**
5.3.3	Transformers	No transformers.	**N**
5.3.4	Functional insulation	Method c) considered. Components mounted on V-1 material.	**P**
5.3.5	Electromechanical components	No electromechanical components.	**N**
5.3.6	Audio amplifiers in ITE	No such parts.	**N**
5.3.7	Simulation of faults	(see appended table 5.3)	**P**
5.3.8	Unattended equipment	No thermostat, temperature limiter or thermal cut-off.	**N**
5.3.9	Compliance criteria for abnormal operating and fault conditions	See clause 5.3.4	**P**
5.3.9.1	During the tests	No fire, no emit and no shrinkage, distortion or loosening if any enclosure part was noticeable on the equipment.	**P**
5.3.9.2	After the tests		**P**
6	**CONNECTION TO TELECOMMUNICATION NETWORKS**		**N**
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment.		**N**
6.1.1	Protection from hazardous voltages	No TNV circuit.	**N**
6.1.2	Separation of the telecommunication network from earth		**N**
6.1.2.1	Requirements		**N**
	Supply voltage (V)		—
	Current in the test circuit (mA)		—
6.1.2.2	Exclusions		**N**
6.2	Protection of equipment users from overvoltages on telecommunication networks		**N**
6.2.1	Separation requirements	No TNV circuit.	**N**
6.2.2	Electric strength test procedure		**N**
6.2.2.1	Impulse test		**N**
6.2.2.2	Steady-state test		**N**
6.2.2.3	Compliance criteria		**N**
6.3	Protection of telecommunication wiring system from overheating		**N**
	Max. output current (A)		—

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Clause	Requirement - Test	Result - Remark	Verdict
	Current limiting method		—
7	**CONNECTION TO CABLE DISTRIBUTION SYSTEMS**		**N**
7.1	General		**N**
7.2	Protection of cable distribution system service personnel, and users of other equipment connected to the system, from hazards voltage in the equipment.		**N**
7.3	Protection of equipment users from overvoltages on the cable distribution system		**N**
7.4	Insulation between primary circuits and cable distribution system		**N**
7.4.1	General		—
7.4.2	Voltage surge test		—
7.4.3	Impulse test		—
A	**ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE**		**N**
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment(see 4.7.3.2)		**N**
A.1.1	Samples		**N**
	Wall thickness(mm) …… :		—
A.1.2	Conditioning of samples; temperature(℃) …. :		**N**
A.1.3	Mounting of samples ……..… :		**N**
A.1.4	Test flame(see IEC 60695-11-3)		**N**
	Flame A, B, C or D		—
A.1.5	Test procedure		**N**
A.1.6	Compliance criteria		**N**
	Sample 1 burning time(s) …… :		—
	Sample 2 burning time(s) ……..…... :		—
	Sample 3 burning time(s) ……..…... :		—
A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		**N**
A.2.1	Samples material		**N**
	Wall thickness(mm) ……... :		—
A.2.2	Conditioning of samples; temperature(℃) … :		**N**
A.2.3	Mounting of samples ……..…... :		**N**
A.2.4	Test flame(see IEC 60695-11-4)		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
A.2.5	Test procedure		**N**
A.2.6	Compliance criteria		**N**
	Sample 1 burning time(s) …….. :		—
	Sample 2 burning time(s) …….. :		—
	Sample 3 burning time(s) …….. :		—
A.2.7	Alternative test acc. To IEC 60695-11-5, cl. 5 and 9		**N**
	Sample 1 burning time(s) …….. :		—
	Sample 2 burning time(s) …….. :		—
	Sample 3 burning time(s) …….. :		—
A.3	Hot flaming oil test(see 4.6.2)		**N**
A.3.1	Mounting of Samples		**N**
A.3.2	Test procedure		**N**
A.3.3	Compliance criterion		**N**
B	**ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS(see 4.7.2.2 and 5.3.2)**		**N**
B.1	General requirements		**N**
	Position …….. :		—
	Manufacturer …….. :		—
	Type …….. :		—
	Rated values …….. :		—
B.2	Test conditions		**N**
B.3	Maximum temperatures		**N**
B.4	Running overload test		**N**
B.5	Locked-rotor overload test		**N**
	Test duration (days) …….. :		—
	Electric strength test: test voltage (V) ….. :		—
B.6	Running overload test for DC motors in secondary circuits		**N**
B.6.1	General		—
B.6.2	Test procedure		—
B.6.3	Alternative test procedure		—
B.6.4	Electric strength test; test voltage (V)		—
B.7	Locked-rotor overload test for DC motors in secondary circuits		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
B.7.1	General		**N**
B.7.2	Test procedure		**N**
B.7.3	Alternative test procedure		**N**
B.7.4	Electric strength test; test voltage (V)		**N**
B.8	Test for motors with capacitors		**N**
B.9	Test for three-phase motors		**N**
B.10	Test for series motors		**N**
	Operating voltage (V) …….. :		—
C	**ANNEX C, TRANSFORMERS(see 1.5.4 and 5.3.3)**		**N**
	Position ……. :		—
	Manufacturer …… :		—
	Type …….. :		—
	Rated values …… :		—
	Method of protection……..:		—
C.1	Overload test		**N**
C.2	Insulation		**N**
	Protection from displacement of winding		—
D	**ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)**		**N**
D.1	Measuring instrument		**N**
D.2	Alternative measuring instrument		**N**
E	**ANNEX E, TEMPERATURE RISE OF A WINDING(see 1.4.13)**		**N**
F	**ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10 and Annex G)**		**N**
G	**ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES**		**N**
G.1	Clearances		**N**
G.1.1	General		—
G.1.2	Summary of the procedure for determining minimum clearances		—
G.2	Determination of mains transient voltage (V) ……. :		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
G.2.1	AC mains supply		—
G.2.2	Earthed d.c. mains supplies		—
G.2.3	Unearthed d.c. amins supplies		—
G.2.4	Battery operation		—
G.3	Determination of telecommunication network transient voltage (V) ……..…….. :		**N**
G.4	Determination of required withstand voltage(V) ……..…….. :		**N**
G.4.1	Mains transients and internal repetitive peaks		—
G.4.2	Transients from telecommunication networks		—
G.4.3	Combination of transients		—
G.4.4	Transients from cable distribution systems		—
G.5	Measurement of transient levels (V) …… :		**N**
	a)transients from a mains supply		—
	For an a.c. mains supply		—
	For a d.c. mains supply		—
	b)transients from a telecommunication network		—
G.6	Determination of minimum clearances …….. :		**N**
H	**ANNEX H, IONIZING RADIATION (see 4.3.13)**		**N**
J	**ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)**		**N**
	Metal used ……..…… :		—
K	**ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.8)**		**N**
K.1	Making and breaking capacity		**N**
K.2	Thermostat reliability; operating voltage(V).. :		**N**
K.3	Thermostat endurance test; operating voltage(V) ……..…….. :		**N**
K.4	Temperature limiter endurance; operating voltage(V) ……..…….. :		**N**
K.5	Thermal cut-out reliability		**N**
K.6	Stability of operation		**N**
L	**ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.2)**		**P**
L.1	Typewriters		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
L.2	Adding machines and cash registers		**N**
L.3	Erasers		**N**
L.4	Pencil sharpeners		**N**
L.5	Duplicators and copy machines		**N**
L.6	Motor-operated files		**N**
L.7	Other business equipment	Max. normal load operation.	**P**
M	**ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)**		**N**
M.1	Introduction		**N**
M.2	Method A		**N**
M.3	Method B		**N**
M.3.1	Ringing signal		**N**
M.3.1.1	Frequency(Hz) …….. :		**N**
M.3.1.2	Voltage(V) ……..…..… :		**N**
M.3.1.3	Cadence; time(s), voltage(V) ……..…..… :		**N**
M.3.1.4	Single fault current (Ma) ……..…..… :		**N**
M.3.2	Tripping device and monitoring voltage …:		**N**
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		**N**
M.3.2.2	Tripping device		**N**
M.3.2.3	Monitoring voltage (V) ……..…..… :		**N**
N	**ANNEX N, IMPULSE TEST GENERATIORS(see 1.5.7.2, 1.5.7.3, 2.10.3.9, 6.2.2.1, 7.3.2, 7.4.3 and Clause G.5)**		**N**
N.1	ITU-T impulse test generators		**N**
N.2	IEC 60065 impulse test generators		**N**
P	**ANNEX P, NORMATIVE REFERENCES**		**P**
Q	**ANNEX Q, Voltage dependent resistors (VDRs)(see 1.5.9.1)**		**N**
	a)preferred climatic categories		**N**
	b)Maximum continuous voltage		**N**
	c)Pulse current		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
R	**ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES**		**N**
R.1	Minimum separation distances for unpopulated coated printed boards(see 2.10.6.2)		**N**
R.2	Reduced clearances (see 2.10.3)		**N**
S	**ANNEX S, PROCEDURE FOR IMPULSE TESTING(see 6.2.2.3)**		**N**
S.1	Test equipment		**N**
S.2	Test procedure		**N**
S.3	Examples of waveforms during impulse testing		**N**
T	**ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER(see 1.1.2)**		**N**
			N
U	**ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)**		**N**
			N
V	**ANNEX V, AC POWER DISTRIBUTION SYSTEMS(see 1.6.1)**		**N**
V.1	Introduction		**N**
V.2	TN power distribution systems		**N**
W	**ANNEX W, SUMMATION OF TOUCH CURRENTS**		**N**
W.1	Touch current from electronic circuits		**N**
W.1.1	Floating circuits		**N**
W.1.2	Earthed circuits		**N**
W.2	Interconnection of several equipments		**N**
W.2.1	isolation		**N**
W.2.2	Common return, isolated from earth		**N**
W.2.3	Common return, connected to protective earth		**N**
X	**ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS(see clause c.1)**		**N**
X.1	Determination of maximum input current		**N**
X.2	Overload test procedure		**N**
Y	**ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)**		**N**

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Clause	Requirement - Test	Result - Remark	Verdict
Y.1	Test apparatus		**N**
Y.2	Mounting of test samples		**N**
Y.3	Carbon-arc light-exposure apparatus		**N**
Y.4	Xenon-arc light exposure apparatus		**N**
Z	**ANNEX Z, OVERVOLTAGE CATEGORIES (see 2.10.3.2 and Clause G.2)**		**P**
AA	**ANNEX AA, MANDREL TEST (see 2.10.5.8)**		**N**
BB	**ANNEX BB, CHANGES IN THE SECOND EDITION**		**--**
CC	**ANNEX CC, Evaluation of integrated circuit (IC) current limiters**		**N**
CC.1	General		**N**
CC.2	Test program 1		**N**
CC.3	Test program 2		**N**
DD	**ANNEX DD, Requirements for the mounting means of rack-mounted equipment**		**N**
DD.1	General		**N**
DD.2	Mechanical strength test, variable N		**N**
DD.3	Mechanical strength test, 250N, including end stops		**N**
DD.4	Compliance		**N**
EE	**ANNEX EE, Household and home/office document/media shredders**		**N**
EE.1	General		**N**
EE.2	Markings and instructions		**N**
	Use of markings or symbols		**N**
	Information of user instructions, maintenance and/or servicing instructions		**N**
EE.3	Inadvertent reactivation test		**N**
EE.4	Disconnection of power to hazardous moving parts		**N**
	Use of markings or symbols		**N**
EE.5	Protection against hazardous moving parts		**N**
	Test with test finger (Figure 2A)		**N**
	Test with wedge probe (Figure EE1 and EE2)		**N**

1.5.1	TABLE: List of critical components				**P**
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Plastic Enclosure	Various	Various	HB or better, thickness min. 1.6 mm.	UL 94	UL
Power Adaptor	Shenzhen Jiakeyuan Industry Co., Ltd.	JKY36-SP1201000	I/P : AC 100-240V, 50/60Hz, 0.5A max, O/P : 12Vdc, 1.0A, Class II, LPS, +25℃	EN 60950-1: 2006+A11:2009 +A1:2010+A12: 2011	LVD (issued by Guangzhou ITL Co., Ltd. report No. 12011280)
All PCBs material	--	--	V-1 or better , 105°C min.	UL 796	UL
[1]) An asterisk indicates a mark which assures the agreed level of surveillance					
Supplementary information:					

1.6.2	TABLE: Electrical data (in normal conditions)					**P**
U (Vdc)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
12	0.38	1.0	4.56	--	--	Maximum normal load.
Supplementary information: The unit operated under all connectors connected and transmit data continuously and USB port connector with a dummy load of 2.5W to represent the USB load.						

2.1.1.5	TABLE: max. V, A, VA test			**N**
Voltage (rated) (V)	Current (rated) (A)	Voltage (max.) (V)	Current (max.) (A)	VA (max.) (VA)
--				
Supplementary information :				

2.1.1.7	TABLE : discharge test			**N**
Location	τ calculated (S)	τ measured (S)	t u → 0V (S)	Comments
--				
Supplementary information :				

2.2.2	TABLE : SELV measurement (under normal conditions)			**N**
Component	Location	max. voltage		Voltage limitation component
		V peak	V rms	
--				
Note :				

2.2.3	TABLE : SELV measurement (under fault conditions)	N

Location	Voltage measured (V)	Comments
--		

Note :

2.4.2	TABLE : limited current circuit measurement	N

Location	Voltage (V)	Current (mA)	Freq. (kHz)	Limit (mA)	Comments
--					

Note :

2.5	TABLE : limited power source measurement	P

	Limits	Measured	Verdict
According to Table 2B (Normal conditions) : USB1, USB port, Uoc=4.975V			
Current (in A)	≤8.0	2.824	Pass
Power (in VA)	≤100	10.90	Pass
According to Table 2B (Single fault conditions) : USB1, USB port, Uoc=4.950V, Q1pin3 to pin2 short.			
Current (in A)	≤8.0	2.942	Pass
Power (in VA)	≤100	12.48	Pass
According to Table 2B (Normal conditions) : PHJ1 (all pins), All RJ-45 port, Uoc=0V			
Current (in A)	≤8.0	0	Pass
Power (in VA)	≤100	0	Pass
Note :			

2.10.2	TABLE : Working voltage measurement	N

Location	Peak voltage (V)	RMS voltage (V)	Comments
--			
Note :			

2.10.3 and 2.10.4	TABLE: Clearance and creepage distance measurements	N

Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
--						
Note :						

2.10.5	TABLE: Distance through insulation measurements	N

Distance through insulation (DTI) at/of:	U peak (V)	U rms (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)
--					
Supplementary information:					

4.3.8	TABLE: Batteries									**N**
The tests of 4.3.8 are applicable only when appropriate battery data is not available										
Is it possible to install the battery in a reverse polarity position?										
	Non-rechargeable batteries			Rechargeable batteries						
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging		
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	
--										
Test results:										Verdict
- Chemical leaks										
- Explosion of the battery										
- Emission of flame or expulsion of molten metal										
- Electric strength tests of equipment after completion of tests										
Supplementary information:										

4.5	TABLE: Thermal requirements						**P**
	Supply voltage (V) ..... :	12Vdc	12Vdc				—
	Ambient T_{min} (°C) ..... :	--	--				—
	Ambient T_{max} (°C) ..... :	--	--				—
Operating condition	A : Tested with horizontal mode. B : Tested with vertical mode. C: Power adapter : I/P : 90V/60Hz with horizontal mode.						
Maximum measured temperature T of part/at::		T (°C)					Allowed T_{max} (°C)
For EUT :							
Operating condition :		A	B				--
02. C291		60.6	59.8				85
03. L44		63.8	63.1				105
04. PCB near U25		68.5	68.7				105
05. PCB near U2		73.3	69.5				105
06. C293		53.2	50.7				85
07. U32 body		57.4	55.8				105
08. U33 body		54.7	53.2				105
09. U34 body		51.9	50.8				105
10. PCB near U11		62.2	58.5				105
11. PCB near U17		62.7	59.2				105
12. Plastic enclosure inside near U17		54.5	49.9				--
13. Plastic enclosure outside near U17		52.1	48.1				95
Tma		40.0	40.0				--

Tamb	23.3	22.3				--
For Power Adaptor : Shenzhen Jiakeyuan / JKY36-SP1201000						
Operating condition :	C					--
01. THR3 (Thermister)	52.0					--
02. C2	60.6					105
03. PCB near U1	67.2					130
04. T1 coil	61.5					110
05. T1 core	61.8					110
06. CY1 (Y Cap.)	58.7					125
07. IC2 (photo coupler)	56.9					100
08. PCB near D7	58.5					130
09. C5	60.6					105
10. Plastic enclosure inside near T1	49.8					--
11. Plastic enclosure outside near T1	47.2					95
Tma	40.0					--
Tamb	37.4					--

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--							

Supplementary information:

The temperatures were measured under worst case normal mode defined in 1.2.2.1 and as described in sub-clause 1.6.2 and at voltages as described above.

The maximum ambient temperature permitted by the manufacturer's specification is +40°C.

Winding components (providing safety isolation):

Class B -> Tmax = 120°C -10°C=110°C

Electrolyte capacitor or components with :

-PCB of 105℃

-Surface of equipment which may be touched :

-Plastic Tmax = 95℃

-Metal Tmax = 70℃

All values for T(℃) are re-calculated from actual ambient.

4.5.5	TABLE: Ball pressure test of thermoplastic parts		**N**
	Allowed impression diameter (mm)	≤ 2 mm	—

Part	Test temperature (°C)	Impression diameter (mm)
--		

Supplementary information:

4.6.1 & 4.6.2	Ventilation opening		**N**
Location	Dimensions (mm)	Remark	
Horizontal mode :			
Front	--	No opening.	
Rear	--	No opening except I/O ports.	
Top	3.0 by 1.35	Provided with numerous openings.	
Bottom	2.0 by 16.0	Provided with numerous openings, also provided two key shaped each measures 17.6 by 4.7 by 4.0 mm.	
Left side	--	No opening.	
Right side	--	No opening.	
Vertical mode :			
Front	3.0 by 1.35	Provided with numerous openings.	
Rear	2.0 by 16.0	Provided with numerous openings, also provided two key shaped each measures 17.6 by 4.7 by 4.0 mm.	
Top	--	No opening except I/O ports.	
Bottom	--	No opening.	
Left side	--	No opening.	
Right side	--	No opening.	
Note : For reference only. The fire enclosure is not required, see clause 4.7.2 for detail information.			

4.7	TABLE: Resistance to fire				**P**
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence
--[1)]	--[1)]	--[1)]	--[1)]	--[1)]	
Supplementary information: 1) see appended table 1.5.1.					

5.1.6	TABLE: Touch currents to and from telecommunication networks			**N**
Condition	L1 → terminal A (mA)	N → terminal A (mA)	Limit (mA)	Comments
--				
Note :				

5.1.8.1	TABLE: Touch currents to and from telecommunication networks			**N**
Condition	L → terminal A (mA)	N → terminal A (mA)	Limit (mA)	Comments
--				
Note :				

5.2	TABLE: Electric strength tests, impulse tests and voltage surge tests			**N**
Test voltage applied between:		Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes/No
--				
Supplementary information:				

5.3	TABLE: Fault condition tests					**P**
	Ambient temperature (°C) .....:		25, if not specified.			—
	Power source for EUT: Manufacturer, model/type, output rating .....:		(see appended table 1.5.1)			—
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Ventilation openings	Blocked	12Vdc	1hr 10min	--	--	Normal operating, no hazards. Ambient: 23.6°C, PCB near U2: 57.2°C. (Test with horizontal mode)
USB1 (USB port)	overload	12Vdc	1hr	--	--	Open circuit voltage=4.975Vdc, Maximum available current=2.824A. Normal operating. No hazards.
All RJ-45 ports All pins–GND	Overload	12Vdc	--	--	--	Open circuit voltage=0Vdc, Maximum available current= 0A. Normal operating. No hazards.
Supplementary information: s-c : short circuit ; o-c : open circuit.						

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict

EN 60950-1:2006/A11:2009/A1:2010/A12:2011 – CENELEC COMMON MODIFICATIONS

IEC60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Contents	Add the following annexes : Annex ZA (normative) Normative references to international publications with their corresponding Europearn publications. Annex ZB (normative) Special national conditions.		**P**
General	Delete all the “country” notes in the reference document (IEC 60950-1:2005) according to the following list: 1.4.8 Note 2; 4.3.6 Note 1& 2 1.5.1 Note 2 & 3; 4.7 Note 4 1.5.7.1 Note; 4.7.2.2 Note 1.5.8 Note 2; 4.7.3.1 Note 2 1.5.9.4 Note; 5.1.7.1 Note 3& 4 1.7.2.1 Note 4,5 & 6; 5.3.7 Note 1 2.2.3 Note; 6 Note 2& 5 2.2.4 Note; 6.1.2.1 Note 2 2.3.2 Note; 6.1.2.2 Note 2.3.2.1 Note 2; 6.2.2 Note 2.3.4 Note 2; 6.2.2.1 Note 2 2.6.3.3 Note 2 & 3; 6.2.2.2 Note 2.7.1 Note; 7.1 Note 3 2.10.3.2 Note 2; 7.2 Note 2.10.5.13 Note 3; 7.3 Note 1& 2 3.2.1.1 Note; G.2.1 Note 2 3.2.4 Note 3; Annex H Note 2 2.5.1 Note 2	Deleted.	**N**
General (A1:2010)	In IEC 60950-1:2005/A1 **delete** all the “country” notes according to the following list : - 1.5.7.1 : Note - 6.1.2.1 : Note 2 - 6.2.2.1 : Note 2 - EE.3 : Note **For special national conditions, see Annex ZB.**		**N**
1.3.Z1	Add the following subclause : 1.3.Z1 Exposure to excessive sound pressure The apparatus shall be so designed and constructed as top resent no danger when used for its intended purpose, either in normal operating conditions or under fault	Not such equipment.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	conditions, particularly providing protection against exposure to excessive sound pressures from headphones or earphones. NOTE Z1 A new method of measurement is described in EN50332-1, Sound system equipment : Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations –Part 1: General method for “one package equipment”, and in EN50332-2, Sound system equipment : Headphones and earphones associated with portable audio equipment –Maximum sound pressure level measurement methodology and limit considerations Part 2 : Guidelines to associate sets with headphones coming from different manufacturers.		
(A12:2011)	In EN 60950-1:2006/A12:2011 Delete the addition of 1.3.Z1 / EN 60950-1: 2006 Delete the addition of 1.2.3.Z1 / EN 60950-1: 2006 / A1:2010		**N**
1.5.1	Add the following NOTE: NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2002/95/EC	Added.	**P**
1.7.2.1 (A1:2010)	Delete NOTE Z1 : **Add** the following paragraph at the end of the subclause : In addition, for a PORTABEL SOUND SYSTEM, the instructions shall include a warning that excessive sound pressure from earphones and headphones can cause hearing loss.		**N**
1.7.2.1 (A12:2011)	In EN 60950-1:2006 / A12:2011 Delete NOTE Z1 and the addition for Portable Sound System. Add the following clause and annex to the existing standard and amendments.		**N**
	Zx Protection against excessive sound pressure from personal music players.		**N**
	Zx.1 General This sub-clause specifies requirements for protection against excessive sound pressure from personal music players that are closely coupled to the ear. It also specifies requirements for earphones and headphones intended for use with personal music players. A personal music player is a portable equipment for personal use, that:		**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	− is designed to allow the user to listen to recorded or broadcast sound or video; and − primarily uses headphones or earphones that can be worn in or on or around the ears; and − allows the user to walk around while in use. NOTE 1 Examples are hand-held or body-worn portable CD players, MP3 audio players, mobile phones with MP3 type features, PDA's or similar equipment. A personal music player and earphones or headphones intended to be used with personal music players shall comply with the requirements of this sub-clause. The requirements in this sub-clause are valid for music or video mode only. The requirements do not apply: − while the personal music player is connected to an external amplifier; or − while the headphones or earphones are not used. NOTE 2 An external amplifier is an amplifier which is not part of the personal music player or the listening device, but which is intended to play the music as a standalone music player. The requirements do not apply to: − hearing aid equipment and professional equipment; NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment. k − analogue personal music players (personal music players without any kind of digital processing of the sound signal) that are brought to the market before the end of 2015. NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies. For equipment which is clearly designed or intended for use by young children, the limits of EN 71-1 apply.		
	Zx.2 Equipment requirements No safety provision is required for equipment that complies with the following: - equipment provided as a package (personal music player with its listening device), where the acoustic output $L_{Aeq,\ T}$ is ≤ 85 dBA measured while playing the fixed "programme simulation noise" as described		**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	in EN 50332-1; and - a personal music player provided with an analogue electrical output socket for a listening device, where the electrical output is ≤ 27 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” as described in EN 50332-1. NOTE 1 Wherever the term acoustic output is used in this clause, the 30 s A-weighted equivalent sound pressure level $L_{Aeq,T}$ is meant. See also Zx.5 and Annex Zx. All other equipment shall: a) protect the user from unintentional acoustic outputs exceeding those mentioned above; and b) have a standard acoustic output level not exceeding those mentioned above, and automatically return to an output level not exceeding those mentioned above when the power is switched off; and c) provide a means to actively inform the user of the increased sound pressure when the equipment is operated with an acoustic output exceeding those mentioned above. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an acoustic output exceeding those mentioned above. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time; and NOTE 2 Examples of means include visual or audible signals. Action from the user is always required. NOTE 3 The 20 h listening time is the accumulative listening time, independent how often and how long the personal music player has been switched off. d) have a warning as specified in Zx.3; and e) not exceed the following: 1) equipment provided as a package (player with Its listening device), the acoustic output shall be ≤ 100 dBA measured while playing the fixed “programme simulation noise” described in EN 50332-1; and 2) a personal music player provided with an analogue electrical output socket for a listening device, the electrical output shall be ≤ 150 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” described in EN 50332-1. For music where the average sound pressure (long term $L_{Aeq,T}$) measured over the duration of the song is lower than the average		

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	produced by the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. In this case T becomes the duration of the song. NOTE 4 Classical music typically has an average sound pressure (long term $L_{Aeq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the song and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. For example, if the player is set with the programme simulation noise to 85 dBA, but the average music level of the song is only 65 dBA, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dBA.		
	Zx.3 Warning The warning shall be placed on the equipment, or on the packaging, or in the instruction manual and shall consist of the following: − the symbol of Figure 1 with a minimum height of 5 mm; and − the following wording, or similar: “To prevent possible hearing damage, do not listen at high volume levels for long periods.” **Figure 1 – Warning label (IEC 60417-6044)** Alternatively, the entire warning may be given through the equipment display during use, when the user is asked to acknowledge activation of the higher level.		**N**
	Zx.4 Requirements for listening devices (headphones and earphones)		**N**
	Zx.4.1 Wired listening devices with analogue input With 94 dBA sound pressure output $L_{Aeq,T}$, the input voltage of the fixed “programme simulation noise” described in EN 50332-2 shall be ≥ 75 mV. This requirement is applicable in any mode where the headphones can operate (active or passive), including any available setting (for		**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	example built-in volume level control). NOTE The values of 94 dBA – 75 mV correspond with 85dBA – 27 mV and 100 dBA – 150 mV.		
	Zx.4.2 Wired listening devices with digital input With any playing device playing the fixed "programme simulation noise" described in EN 50332-1 (and respecting the digital interface standards, where a digital interface standard exists that specifies the equivalent acoustic level), the acoustic output LAeq,T of the listening device shall be ≤ 100 dBA. This requirement is applicable in any mode where the headphones can operate, including any available setting (for example built-in volume level control, additional sound feature like equalization, etc.). NOTE An example of a wired listening device with digital input is a USB headphone.		**N**
	Zx.4.3 Wireless listening devices In wireless mode : - with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and - respecting the wireless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and - with volume and sound settings in the listening device (for example built-in volume level control, additional sound feature like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the above-mentioned programme simulation noise, the acoustic output $L_{Aeq,T}$ of the listening device shall be ≤ 100 dBA. NOTE An example of a wireless listening device is a Bluetooth headphone.		**N**
	Zx.5 Measurement methods Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable. Unless stated otherwise, the time interval T shall be 30 s. NOTE Test method for wireless equipment provided without listening device should be defined. k		**N**
2.7.1	Replace the subclause as follows: Basic requirements To protect against excessive current, short-circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the	Replaced.	**P**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	equipment or as parts of the building installation, subject to the following, a), b) and c): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as parts of the equipment; b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, shortcircuit and earth fault protection may be provided by protective devices in the building installation; c) it is permitted for PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, to rely on dedicated overcurrent and shortcircuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.		
2.7.2	This subclause has been declared 'void'.		**N**
3.2.3	Delete the NOTE in Table 3A, and delete also in this table the conduit sizes in parentheses.	Deleted.	**N**
3.2.5.1	Replace "60245 IEC 53" by "H05 RR-F" ; "60227 IEC 52" by "H03 VV-F or H03 VVH2-F"; "60227 IEC 53" by "H05 VV-F or H05 VVH2-F2". In Table 3B, replace the first four lines by the following: | Up to and including 6 | 0,75 [a)] | | Over 6 up to and including 10 | (0,75) [b)] 1,0 | | Over 10 up to and including 16 | (1,0) [c)] 1,5 | In the conditions applicable to Table 3B delete the words "in some countries" in condition [a)] . In NOTE 1, applicable to Table 3B, delete the second sentence.	Replaced.	**N**
3.3.4	In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following: | Over 10 up to and including 16 | 1,5 to 2,5 | 1,5 to 4 | Delete the fifth line: conductor sizes for 13 to 16 A.	Deleted.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
4.3.13.6 (A1:2010)	Replace the existing NOTE by the following : NOTE Z1 Attention is drawn to : 1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz, and 2006/25/EC : Directive on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation). Standards taking into account this Recommendation which demonstrate compliance with the applicable EU Directive are indicated in the OJEC.	Added.	**N**
Annex H	Replace the last paragraph of this annex by: At any point 10 cm from the surface of the OPERATOR ACCESS AREA, the dose rate shall not exceed 1 µSv/h (0,1 mR/h) (see NOTE). Account is taken of the background level. Replace the notes as follows: NOTE These values appear in Directive 96/29/Euratom. Delete NOTE 2.	Replaced.	**N**
Biblio-graphy	Additional EN standards.		**--**
ZA	NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS		**--**
ZB	SPECIAL NATIONAL CONDITIONS		**P**
1.2.4.1	In **Denmark**, certain types of Class I appliances (see 3.2.1.1) may be provided with a plug not establishing earthing conditions when inserted into Danish socket-outlets.	Class III equipment.	**N**
1.2.13.14	In Norway and Sweden, for requirements see 1.7.2.1 and 7.3 of this annex.		**N**
1.5.7.1	Replace the existing SNC by the following: In Finland, Norway and Sweden, resistors bridging BASIC INSULATION in CLASS I PLUGGABLE EQUIPMENT TYPE A must comply with the requirements in 1.5.7.1. In addition when a single resistor is used, the resistor must withstand the resistor test in 1.5.7.2.		**N**
1.5.8	In **Norway**, due to the IT power system used (see annex V, Figure V.7), capacitors are required to be rated for the applicable line-to-line voltage (230 V).	Class III equipment.	**N**
1.5.9.4	In **Finland**, **Norway** and **Sweden**, the third dashed sentence is applicable only to equipment as defined in 6.1.2.2 of this annex.	No such construction.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
1.7.2.1	Add as new SNC: In Norway and Sweden, the screen of the cable distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation need to be isolated from the screen of a cable distribution system. It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by e.g. a retailer. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in: “Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).” NOTE In Norway, due to regulation for installations of cable distribution systems, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): “Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et kabel -TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel -TV nettet installeres en galvanisk isolator mellom utstyret og kabel -TV nettet.” Translation to Swedish: ”Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel -TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.”		**N**
1.7.5	Add the following paragraph to the existing SNC for Denmark:	Added.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	For CLASS II EQUIPMENT the socket outlet shall be in accordance with Standard Sheet DKA 1-4a.		
2.2.4	In Norway, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.	No TNV.	**N**
2.3.2	In Finland, Norway and Sweden there are additional requirements for the insulation. See 6.1.2.1 and 6.1.2.2 of this annex.	No TNV.	**N**
2.3.4	In Norway, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.	No TNV.	**N**
2.6.3.3	In the United Kingdom, the current rating of the circuit shall be taken as 13 A, not 16 A.	Class III equipment.	**N**
2.7.1	In the United Kingdom, to protect against excessive currents and short-circuits in the PRIMARY CIRCUIT of DIRECT PLUG-IN EQUIPMENT, tests according to 5.3 shall be conducted, using an external protective device rated 30 A or 32 A. If these tests fail, suitable protective devices shall be included as integral parts of the DIRECT PLUG-IN EQUIPMENT, so that the requirements of 5.3 are met.	Class III equipment.	**N**
2.10.5.13	In Finland, Norway and Sweden, there are additional requirements for the insulation, see 6.1.2.1 and 6.1.2.2 of this annex.	No TNV.	**N**
3.2.1.1	In Switzerland, supply cords of equipment having a RATED CURRENT not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets: SEV 6532-2.1991 Plug Type 15 3P+N+PE 250/400 V, 10 A SEV 6533-2.1991 Plug Type 11 L+N 250 V, 10 A SEV 6534-2.1991 Plug Type 12 L+N+PE 250 V, 10 A In general, EN 60309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and socket-outlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998: SEV 5932-2.1998 Plug Type 25 3L+N+PE 230/400 V, 16 A SEV 5933-2.1998 Plug Type 21 L+N 250 V, 16 A SEV 5934-2.1998 Plug Type 23 L+N+PE 250 V, 16 A		**N**
3.2.1.1	In Denmark, supply cords of single-phase equipment having a rated current not exceeding13 A shall be provided with a plug according to the Heavy Current Regulations, Section 107-2-D1. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where		**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If poly-phase equipment and single-phase equipment having a RATED CURRENT exceeding 13 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations, Section 107-2-D1 or EN 60309-2.		
3.2.1.1	In Spain, supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to UNE 20315:1994. Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994. If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2.		**N**
3.2.1.1	In the United Kingdom, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug, shall be fitted with a 'standard plug' in accordance with Statutory Instrument 1768:1994-The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those regulations. NOTE 'Standard plug' is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.		**N**
3.2.1.1	In Ireland, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to I.S. 411 by means of that flexible cable or cord and plug, shall be fitted with a 13 A plug in accordance with Statutory Instrument 525:1997 -National Standards Authority of Ireland (section 28) (13 A Plugs and Conversion Adaptors for Domestic Use) Regulations 1997.		**N**
3.2.4	In Switzerland, for requirements see 3.2.1.1 of this annex.		**N**
3.2.5.1	In the United Kingdom, a power supply cord with conductor of 1,25 mm2 is allowed for		**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	equipment with a rated current over 10 A and up to and including 13 A.		
3.3.4	In the United Kingdom, the range of conductor sizes of flexible cords to be accepted by terminals for equipment with a RATED CURRENT of over 10 A up to and including 13 A is: • 1,25 mm2 to 1,5 mm2 nominal cross-sectional area.		**N**
4.3.6	In the United Kingdom, the torque test is performed using a socket outlet complying with BS 1363 part 1:1995, including Amendment 1:1997 and Amendment 2:2003 and the plug part of DIRECT PLUG-IN EQUIPMENT shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16 and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.		**N**
4.3.6	In Ireland, DIRECT PLUG-IN EQUIPMENT is known as plug similar devices. Such devices shall comply with Statutory Instrument 526:1997 -National Standards Authority of Ireland (Section 28) (Electrical plugs, plug similar devices and sockets for domestic use) Regulations, 1997.		**N**
5.1.7.1	In Finland, Norway and Sweden TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for the following equipment: • STATIONARY PLUGGABLE EQUIPMENT TYPE A that - is intended to be used in a RESTRICTED ACCESS LOCATION where equipment bonding has been applied, for example, in a telecommunication centre; and – - has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR; and - is provided with instructions for the installation of that conductor by a SERVICE PERSON; • STATIONARY PLUGGABLE EQUIPMENT TYPE B; • STATIONARY PERMANENTLY CONNECTED EQUIPMENT.	Class III equipment.	**N**
6.1.2.1 (A1:2010)	In **Finland, Norway** and **Sweden**, add the following text between the first and second paragraph of the compliance clause: If this insulation is solid, including insulation forming part of a component, it shall at least	No TNV.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	consist of either - two layers of thin sheet material, each of which shall pass the electric strength test below, or - one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition - passes the tests and inspection criteria of 2.10.11 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.10 shall be performed using 1,5 kV), and - is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV. It is permitted to bridge this insulation with an optocoupler complying with 2.10.5.4 b) . It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2. A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions: - the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14:2005, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 60950-1:2006, 6.2.2.1; - the additional testing shall be performed on all the test specimens as described in EN 60384-14:2005; - the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14:2005.		
6.1.2.2	In Finland, Norway and Sweden, the exclusions are applicable for PERMANENTLY CONNECTED	No TNV.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	EQUIPMENT, PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipment bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a SERVICE PERSON.		
7.2	In Finland, Norway and Sweden, for requirements see 6.1.2.1 and 6.1.2.2 of this annex. The term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.	Not connected to cable distribution system.	**N**
7.3	In Norway and Sweden, there are many buildings where the screen of the coaxial cable is normally not connected to the earth in the building installation.	Not connected to cable distribution system.	**N**
7.3	In Norway, for installation conditions see EN 60728-11:2005.	Not connected to cable distribution system.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	FINLAND NATIONAL DIFFERENCES (EN 60950-1:2006/A11:2009/A1:2010/A12:2011)		**P**
1.5.7.1	In **Finland** resistors bridging BASIC INSULATION in CLASS I PLUGGABLE EQUIPMENT TYPE A must comply with the requirements in 1.5.7.1. In addition when a single resistor is used, the resistor must withstand the resistor test in 1.5.7.2.	Class III equipment.	**N**
1.5.9.4	The third dashed sentence is applicable only to equipment as defined in 6.1.2.2 of this annex.	No such construction.	**N**
1.7.2.1	CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: "Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan"	Class III equipment.	**N**
2.3.2	There are additional requirements for the insulation. See 6.1.2.1 and 6.1.2.2 of this annex.	No TNV.	**N**
2.10.5.13	There are additional requirements for the insulation, see 6.1.2.1 and 6.1.2.2 of this annex.	No TNV.	**N**
5.1.7.1	TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for the following equipment: • STATIONARY PLUGGABLE EQUIPMENT TYPE A that - is intended to be used in a RESTRICTED ACCESS LOCATION where equipment bonding has been applied, for example, in a telecommunication centre; and – - has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR; and - is provided with instructions for the installation of that conductor by a SERVICE PERSON; • STATIONARY PLUGGABLE EQUIPMENT TYPE B; • STATIONARY PERMANENTLY CONNECTED EQUIPMENT.	Class III equipment.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
6.1.2.1 (A1:2010)	In **Finland**, add the following text between the first and second paragraph of the compliance clause: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either - two layers of thin sheet material, each of which shall pass the electric strength test below, or - one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition - passes the tests and inspection criteria of 2.10.11 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.10 shall be performed using 1,5 kV), and - is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV. It is permitted to bridge this insulation with an optocoupler complying with 2.10.5.4 b) . It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2. A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions: - the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14:2005, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 60950-1:2006, 6.2.2.1; - the additional testing shall be performed on all the test specimens as described in EN 60384-14:2005; - the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the	No TNV.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	sequence of tests as described in EN 60384-14:2005.		
6.1.2.2	The exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT, PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipment bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a SERVICE PERSON.	No TNV.	**N**
7.2	For requirements see 6.1.2.1 and 6.1.2.2 of this annex. The term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.	Not connected to cable distribution system.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	GERMANY NATIONAL DIFFERENCES (VDE 0805-1:2011-01)		**P**
Annex ZC, 1.7.2.1	According to GPSG, section 2, clause 4: If certain rules on the use, supplementation or maintenance of an item of technical work equipment or ready-to-use commodity must be observed in order to guarantee safety and health, instructions for use in German must be supplied when it is brought into circulation.		**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	KOREAN NATIONAL DIFFERENCES (K60950-1)		**P**
1.5.101	Addition: Plugs for the connection of the apparatus to the supply mains shall comply with the Korean requirement (KSC 8305).	No supply cord provided.	**N**
8	Addition: EMC The apparatus shall comply with the relevant CISPR standards.	Compliance shall be evaluated during national approval.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	CANADIAN NATIONAL DIFFERENCES (CAN/CSA C22.2 No. 60950-1-07, Second Edition)		**P**
1.1.1	All equipment is to be designed to allow installation in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2. Also, unless marked or otherwise identified, installation is allowed per the Standard for the Protection of Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75.	Equipment able to be installed in accordance with the National Electrical Code ANSI/NFPA 70 and the Canadian Electrical Code, Part 1.	**P**
1.4.14	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.		**N**
1.5.5	For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the CEC/NEC. For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies that are not types specified in the CEC are required to have special construction features and identification markings.	No such cables or cords provided.	**N**
1.7.1	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. A voltage rating that exceeds an attachment plug cap rating is only permitted if it does not exceed the extreme operating conditions in Table 2 of CAN/CSA C22.2 No. 235, and if it is part of a range that extends into the Table 2 "Normal Operating Conditions." Likewise, a voltage rating shall not be lower than the specified "Normal Operating Conditions," unless it is part of a range that extends into the "Normal Operating Conditions."	Class III equipment.	**N**
1.7.7	Wiring terminals intended to supply Class 2 outputs in accordance with CEC Part 1 or NEC shall be marked with the voltage rating and “Class 2” or equivalent. Marking shall be located adjacent to the terminals and shall be visible during wiring.	No such parts provided.	**N**
2.5	Where a fuse is used to provide Class 2, Limited Power Source, or TNV current limiting, it shall not be operator-accessible unless it is not interchangeable.	No such fuse provided.	**N**
2.7.1	Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is required for all standard supply outlets and receptacles (such as supplied in power	No such components provided.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	distribution units) if the supply branch circuit protection is not suitable. Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require special transformer overcurrent protection.		
3.2	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains shall be in accordance with the NEC/CEC.	Class III equipment.	**N**
3.2.1	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.	No supply cord provided.	**N**
3.2.1.2	Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment, is required to comply with special earthing, wiring, marking and installation instruction requirements.	Class III equipment.	**N**
3.2.3	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.	Class III equipment.	**N**
3.2.5	Power supply cords are required to be no longer than 4.5 m in length. Flexible power supply cords are required to be compatible with Tables 11 and 12 of the CEC and Article 400 of the NEC.	No supply cord provided.	**N**
3.2.9	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.	Class III equipment.	**N**
3.3	Wiring terminals and associated spacings for field wiring connections shall comply with CSA C22.2 No. 0.	No such terminals provided.	**N**
3.3.3	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm_2).	No such screws provided.	**N**
3.3.4	Terminals for permanent wiring, including protective earthing terminals, are required to be suitable for Canadian/US wire gauge sizes, rated 125 percent of the equipment rating, and be specially marked when specified (1.7.7).	No such terminals provided.	**N**
3.4.2	Motor control devices are required for cord-connected equipment with a motor if the equipment is rated more than 12 A, or if the motor has a nominal voltage rating greater than 120 V, or is rated more than 1/3 hp (locked rotor current over 43 A).	No such device.	**N**
3.4.8	Vertically-mounted disconnect switches and circuit breakers are required to have the "on" position indicated by the handle in the up position.	No such device.	**N**
3.4.11	For computer room applications, equipment with battery systems capable of supplying	Not such application.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	750 VA for five minutes are required to have a battery disconnect means that may be connected to the computer room remote poweroff circuit.		
4.3.12	The maximum quantity of flammable liquid stored in equipment is required to comply with NFPA 30.	No flammable liquid.	**N**
4.3.13.5	Equipment with lasers is required to meet the Canadian Radiation Emitting Devices Act, REDR C1370 and/or Code of Federal Regulations 21 CFR 1040, as applicable.	No laser provided.	**N**
4.7	For computer room applications, automated information storage systems with combustible media greater than 0.76 m_3 (27 cu ft) are required to have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.	Not such application.	**N**
4.7.3.1	For computer room applications, enclosures with combustible material measuring greater than 0.9 m_2 (10 sq ft) or a single dimension greater than 1.8 m (6 ft) are required to have a flame spread rating of 50 or less. For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less.	Not such application.	**N**
Annex H	Equipment that produces ionizing radiation is required to comply with the Canadian Radiation Emitting Devices Act, REDR C1370 and/or Code of Federal Regulations, 21 CFR 1020, as applicable.	No CRTs.	**N**
OTHER DIFFERENCES			
1.5.1	Some components and materials associated with the risk of fire, electric shock, or personal injury are required to have component or material ratings in accordance with the applicable national (Canadian and/or U.S.) component or material standard requirements. These components include: attachment plugs, battery packs (rechargeable type, used with transportable equipment), cathode ray tubes, circuit breakers, communication circuit accessories, connectors (used for current interruption of nonLPS circuits), cord sets and power supply cords, direct plugin equipment, enclosures (outdoor), flexible cords and cables, fuses (branch circuit), fuseholders, groundfault current interrupters, industrial control equipment, insulating tape, interconnecting cables, lampholders, limit controls, printed wiring, protectors for communications circuits, receptacles, solid state controls, supplementary protectors, switches (including interlock switches), thermal cutoffs,	Complied. Components are UL or CSA approved, see component list 1.5.1.	**P**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	thermostats, (multilayer) transformer winding wire, transient voltage surge suppressors, tubing, wire connectors, and wire and cables.		
1.6.1.2	A circuit for connection to the DC Mains Supply is classified as either a SELV Circuit, TNV-2 Circuit or Hazardous Voltage Circuit depending on the maximum operating voltage of the supply. This maximum operating voltage shall include consideration of the battery charging “float voltage” associated with the intended supply system, regardless of the marked power rating of the equipment.	No TNV circuits.	**N**
2.3.1	For TNV-2 and TNV-3 circuits with other than ringing signals and with voltages exceeding 42.4 Vpeak or 60 Vd.c., the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions.	No TNV circuits.	**N**
2.3.2.1	In the event of a single fault between TNV and SELV circuits, the limits of 2.2.3 apply to SELV Circuits and accessible conductive parts.	No TNV circuits.	**N**
2.6.3.3	The current rating of the circuit shall be taken as 20 A not 16 A	Class III equipment.	**N**
2.6.3.4	Protective bonding conductors of non-standard protective bonding constructions (e.g., printed circuit traces) may be subjected to the additional limited short circuit test conditions specified.		**N**
4.2.8.1	Enclosures around CRTs with a face diameter of 160 mm or more are required to reduce the risk of injury due to the implosion of the CRT.	No CRTs.	**N**
4.3.2	Equipment with handles is required to comply with special loading tests.	No handles.	**N**
5.1.8.3	Equipment intended to receive telecommunication ringing signals is required to comply with a special touch current measurement tests.	No TNV circuits.	**N**
5.3.7	Internal (e.g., card cage) SELV circuit connectors and printed wiring board connectors that are accessible to the operator and that deliver power are to be overloaded. During abnormal operating testing, if a circuit is interrupted by the opening of a component, the test shall be repeated twice (three tests total) using new components as necessary.		**N**
6.4	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses in accordance with 6.4 and Annex NAC.	No TNV circuits.	**N**
M.2	Continuous ringing signals up to 16 mA only	No TNV circuits.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	are permitted if the equipment is subjected to special installation and performance restrictions.		
Annex NAD	Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear is required to comply with special acoustic pressure requirements.	No TNV circuits.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	US NATIONAL DIFFERENCES (UL 60950-1, Second Edition)		**P**
1.1.1	All equipment is to be designed to allow installation in accordance with the National Electrical Code ANSI/NFPA 70, and when applicable, the National Electrical Safety Code, IEEE C2. Also, unless marked or otherwise identified, installation is allowed per the Standard for the Protection of Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75.	Complied.	**P**
1.4.14	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20 A.	Class III equipment.	**N**
1.5.5	For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type specified in the NEC. For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies that are not types specified in the NEC are required to have special construction features and identification markings.		**N**
1.7.1	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wires) require a special marking format for electrical ratings.	Class III equipment.	**N**
2.5	Where a fuse is used to provide Class 2, Limited Power Source, or TNV current limiting, it shall not be operator-accessible unless it is not interchangeable.	No such parts provided.	**N**
2.7.1	Suitable NEC branch circuit protection rated at the maximum circuit rating is required for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable. Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require special transformer overcurrent protection.	No such components provided.	**N**
3.2	Wiring methods permit connection of equipment to primary power supply in accordance with the NEC	Class III equipment.	**N**
3.2.1	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.	No such cords provided.	**N**
3.2.1.2	Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment, is required to comply with special earthing, wiring, marking and installation instruction requirements.	Class III equipment.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
3.2.3	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.	Class III equipment.	**N**
3.2.5	Power supply cords are required to be no longer than 4.5 m in length and minimum length shall be 1.5 m. Flexible power supply cords are required to be compatible with Article 400 of the NEC.	No such cord provided.	**N**
3.2.9	Permanently connected equipment must have a suitable wiring compartment and wire bending space.		**N**
3.3.3	Wire binding screw terminal are not permitted to attach connectors larger than 10 AWG (5.3 mm^2).	No such screws provided.	**N**
3.3.4	Terminals for permanent wiring, including protective earthing terminals, must be suitable for U.S wire gauge sizes, rated 125 percent of the equipment rating, and be specially marked when specified (1.7.7)	No such terminals provided.	**N**
3.4.2	Motor control devices are required for cord-connected equipment with a motor if the equipment is rated more than 12 A, or if the motor has a nominal voltage rating greater than 120 V, or is rated more than 1/3 hp (locked rotor current over 43 A)	No motor.	**N**
3.4.8	Vertically mounted disconnect switches and circuit breakers are required to have the “on” position indicated by the handle in the up position.	No such devices incorporated.	**N**
3.4.11	For computer-room applications, equipment with battery systems capable of supplying 750 VA for five minutes are required to have a battery disconnect means that may be connected to the computer room remote power-off circuit.	Not such application.	**N**
4.3.12	The max. quantity of flammable liquid stored in equipment per ANSI/NFPA 30.	No flammable liquid.	**N**
4.3.13.5	Equipment with lasers is required to meet the Code of Federal Regulations 21 CFR 1040.	No lasers.	**N**
4.7	For computer room applications, automated information storage systems with combustible media greater than 0.76 m^3 (27 cu ft) are required to have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.	Not such application.	**N**
4.7.3.1	For computer room applications, enclosures with combustible material measuring greater tha 0.9 m^2 (10 sq ft) or a single dimension greater than 1.8 m (6ft) are required to have a flame spread rating of 50 or less. For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less.	Not such application.	**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
Annex H	Equipment that produces ionizing radiation must comply with Federal Regulations, 21 CFR 1020	No CRTs.	**N**
OTHER NATIONAL DIFFERENCES			
1.5.1	Some components and materials associated with the risk of fire, electric shock, or personal injury are required to have component or material ratings in accordance with the applicable national (Canadian and/or U.S.) component or material standard requirements. These components include: attachment plugs, battery packs (rechargeable type, used with transportable equipment), cathode ray tubes, circuit breakers, communication circuit accessories, connectors (used for current interruption of nonLPS circuits), cord sets and power supply cords, direct plugin equipment, enclosures (outdoor), flexible cords and cables, fuses (branch circuit), fuseholders, groundfault current interrupters, industrial control equipment, insulating tape, interconnecting cables, lampholders, limit controls, printed wiring, protectors for communications circuits, receptacles, solid state controls, supplementary protectors, switches (including interlock switches), thermal cutoffs, thermostats, (multilayer) transformer winding wire, transient voltage surge suppressors, tubing, wire connectors, and wire and cables.	Complied. Components are UL or CSA approved, see component list 1.5.1.	**P**
1.6.1.2	A circuit for connection to the DC Mains Supply is classified as either a SELV Circuit, TNV-2 Circuit or Hazardous Voltage Circuit depending on the maximum operating voltage of the supply. This maximum operating voltage shall include consideration of the battery charging “float voltage” associated with the intended supply system, regardless of the marked power rating of the equipment.	No TNV circuits.	**N**
2.3.1	For TNV-2 and TNV-3 circuits with other than ringing signals and with voltages exceeding 42.4 Vpeak or 60 Vd.c., the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions.	No TNV circuits.	**N**
2.3.2.1	In the event of a single fault between TNV and SELV circuits, the limits of 2.2.3 apply to SELV Circuits and accessible conductive parts.	No TNV circuits.	**N**
2.6.3.4	Protective bonding conductors of non-standard protective bonding constructions (e.g., printed circuit traces) may be subjected to the additional limited short circuit test		**N**

National Differences			
Clause	Requirement − Test	Result – Remark	Verdict
	conditions specified.		
4.2.8.1	Enclosures around CRTs with a face diameter of 160 mm or more are required to reduce the risk of injury due to the implosion of the CRT.	No CRTs.	**N**
4.2.11	For equipment intended for mounting on racks and provided with slide/rails allowing the equipment to slide away from the rack for installation, service and maintenance, additional construction, performance and marking requirements are applicable to determine the adequacy of the slide/rails.	No such device.	**N**
4.3.2	Equipment with handles is required to comply with special loading tests.	No handles.	**N**
5.1.8.3	Equipment intended to receive telecommunication ringing signals is required to comply with a special touch current measurement tests.	No TNV circuits.	**N**
5.3.7	Internal (e.g., card cage) SELV circuit connectors and printed wiring board connectors that are accessible to the operator and that deliver power are to be overloaded. During abnormal operating testing, if a circuit is interrupted by the opening of a component, the test shall be repeated twice (three tests total) using new components as necessary.		**N**
6.4	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses in accordance with 6.4 and Annex NAC.	No TNV circuits.	**N**
M.2	Continuous ringing signals up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions.	No TNV circuits.	**N**
Annex NAD	Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear is required to comply with special acoustic pressure requirements.	No TNV circuits.	**N**
Annex NAF	Document (paper) shredders likely to be used in a home or home office (Pluggable Equipment Type A plug configuration) are required to comply with additional requirements, including markings/instructions, protection against inadvertent reactivation of a safety interlock, disconnection from the mains supply (via provision of an isolating switch), and protection against operator access (accessibility determined via new accessibility probe & probe/wedge).		**N**

Attachment –A.

EUT Photos

Photo # 1

Photo # 2

Photo # 3

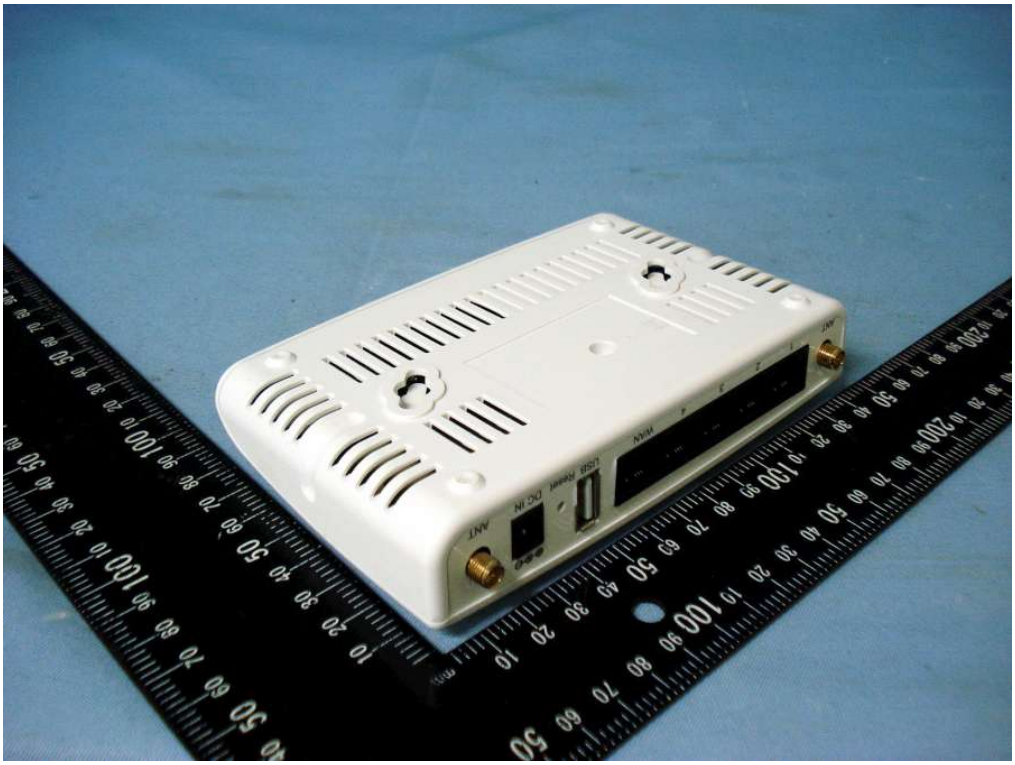


Photo # 4

Photo # 5

Photo # 6

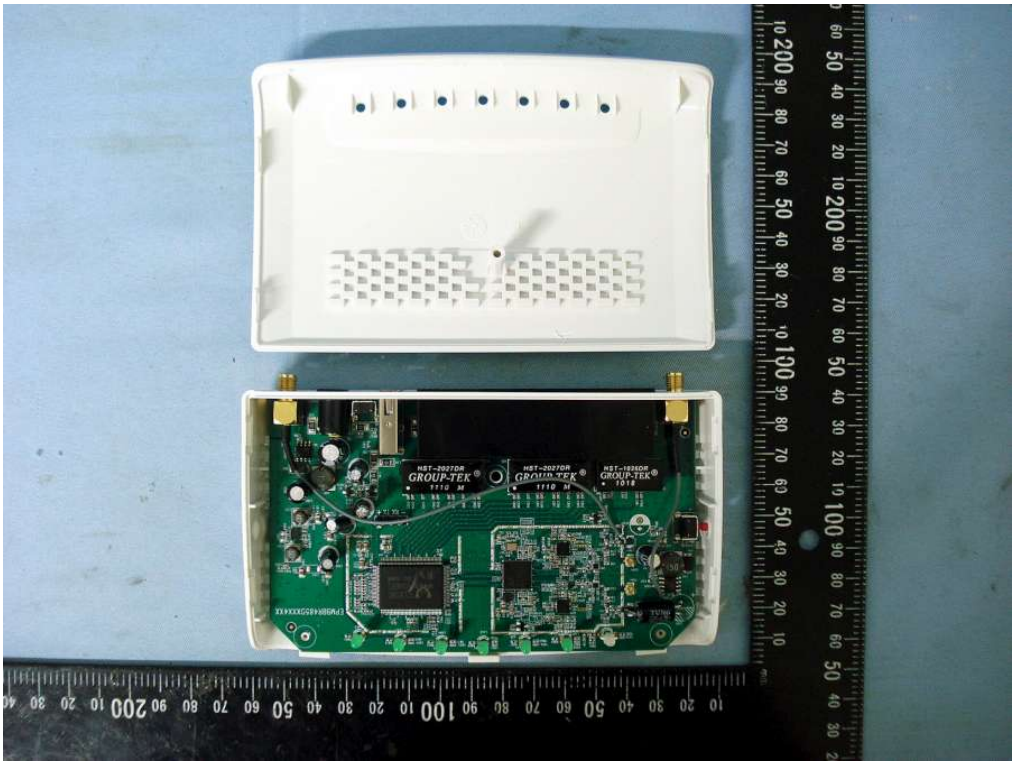


Photo # 7

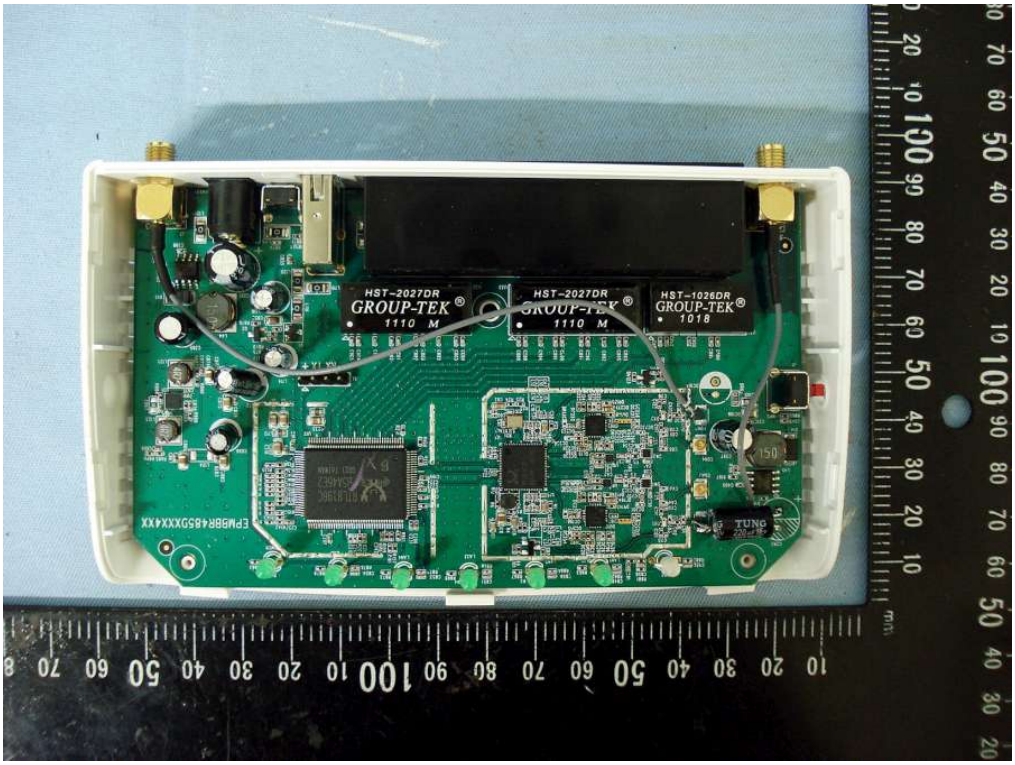


Photo # 8

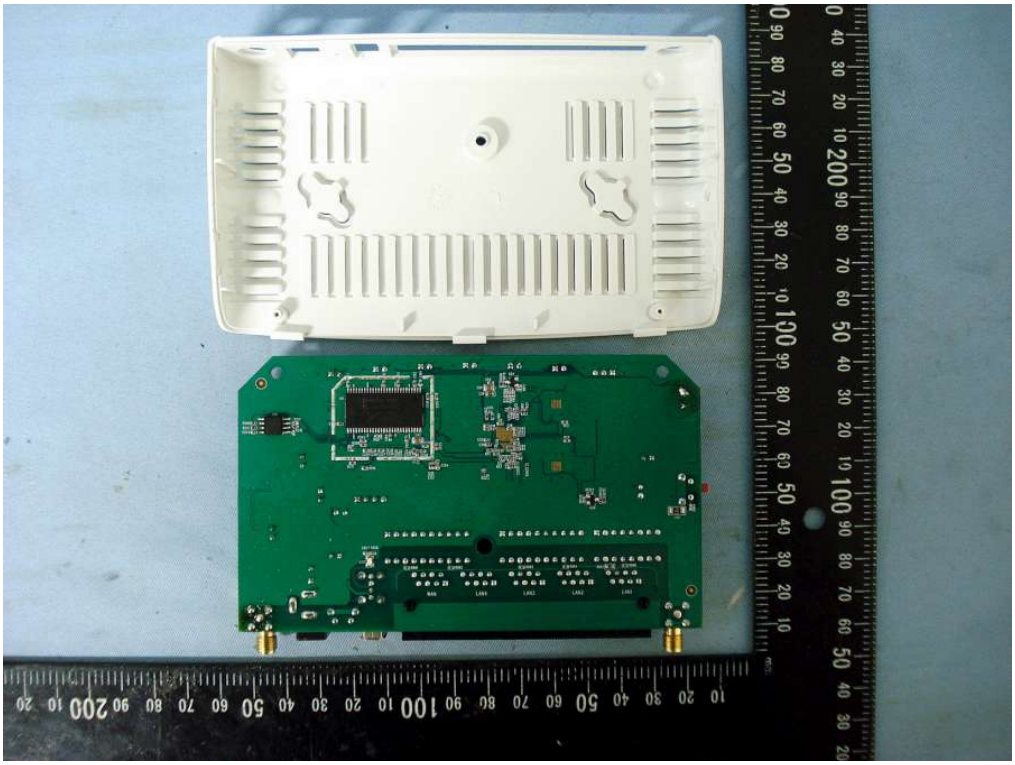


Photo # 9

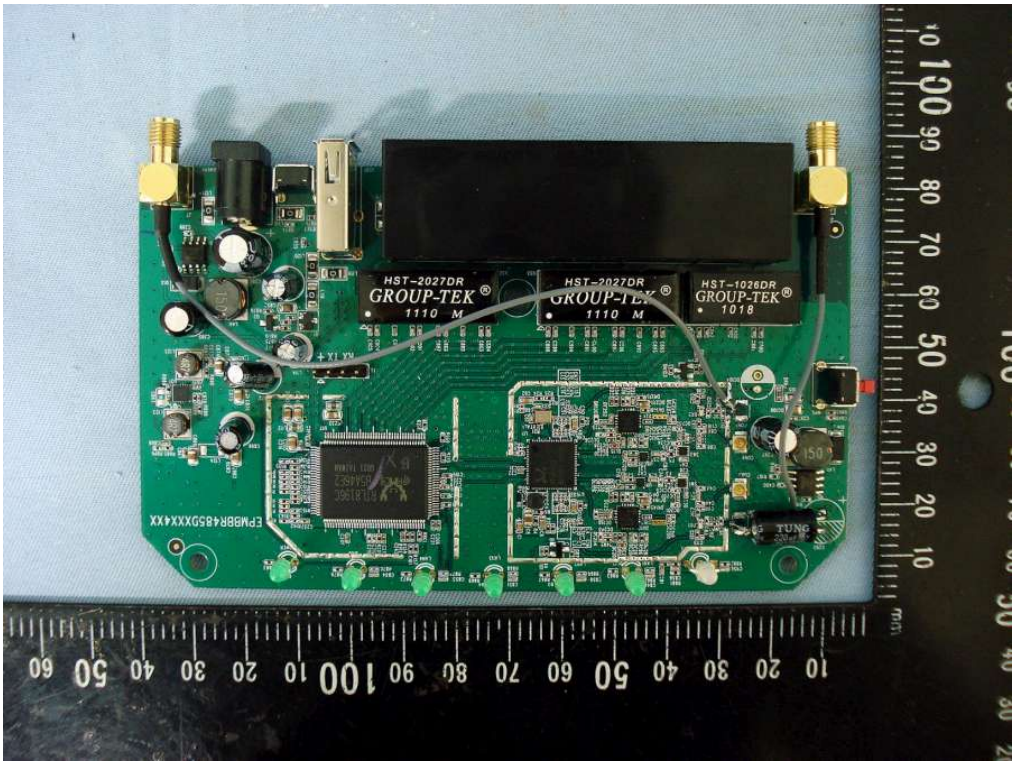
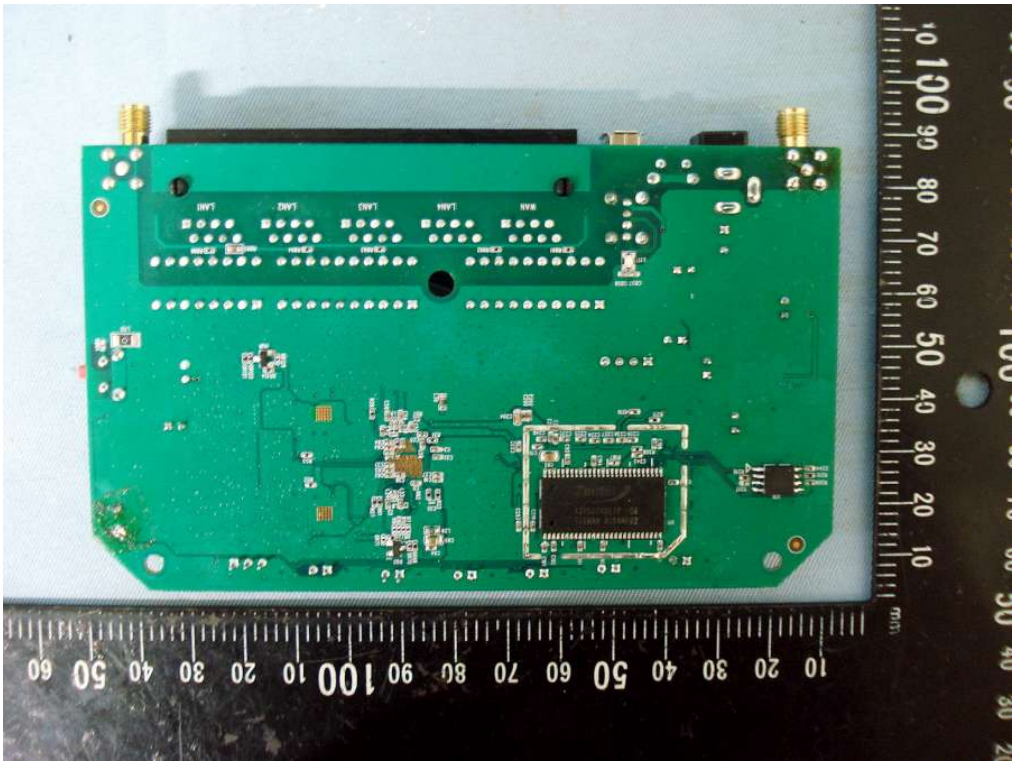


Photo # 10



Attachment - B.

Product ID Label

Trade-mark can be E-TOP、SAPIDO

Model name can be BR485d、RB-1830

Attachment – C.

Schematic and Layout

(See attachment software copy)

Attachment - D.

User manual

(See attachment software copy)

Attachment - E.

Measuring Instrument List

	Id Code	Kind of Instrument	Manufacturer	Model / type	Serial No.	Specification		Acceptability	Calibrated Date	Calibrated until
V	K5E118	Mobile Recorder	YOKOGAWA	MV230-2-2-1-1D	12A525267		K Type - 200°C~1370°C	±2%	09.05.2011	09.04.2012
V	K5E123	DC Electronic Load	Prodigit	3310C	30402C216	a	0~150W	±1.5%	05.02.2011	05.01.2012
						b	0~60Vdc			
						c	0~30A			
V	K5E126	Oven	Ten Billion	TPO-1	TBN-920510		25~200°C	±3%	08.10.2011	08.09.2012
V	K5E127	Test Pin	TESTING	----------	K5E127		IEC61032 Probe13 Φ3(4Φ) x 15mm	Refer to IEC61032	08.18.2011	08.17.2012
V	K5E168	Digital Timer	--	5117	5823Q011		100hrs (H/M/S)	±1%	10.13.2011	10.12.2012
V	K5E179	Electronic Scale	G.TECH	100kg	6504Q311		5g~100Kg	±1%	05.10.2011	05.09.2012
V	K5E183	Steel Rule	HOL	1000mm	A01150		0~1000mm	±0.4%	11.03.2011	11.02.2012
V	K5E188	Test Finger	TESTING	----------	K5E188		IEC61032 Probe B ----------	Refer to IEC61032	08.18.2011	08.17.2012
V	K5E207	Smart Electronic Load	Chroma	6304	63042630	a	0~6A,0~64V,0~60W	±1.5%	05.18.2011	05.17.2012
						b	0~20A,0~64V,0~100W			
V	K5E216	Mobile Recorder	YOKOGAWA	MV230-1-2-1-1D	S5E805255		K Type - 200°C~1370°C	±2%	10.26.2011	10.25.2012
V	K5E225	Programmable AC Source	Chroma	6530	3944		3KVA, 0~300V, 15~2KHz	±1.5%	11.29.2011	11.28.2012
V	K5E235	Digital Multimeter	FLUKE	15B	11390159	a	0~1000 (Vac/dc)	±1.5%	10.15.2011	10.14.2012
						b	0~10A (ac/dc)			